Occupational HAZARDS

THERE'S PROFIT IN PREVENTION

JULY
1948

•

ROUTE TO
OUR PLANT
E PROTECTION
EN: FEATURE
ECTION ON
E PROTECTION
R INDUSTRY

•

Cost of Amputations $825.04

SEE PAGE 15

IN THIS ISSUE:

LE TOURNEAU'S AMPUTATION COSTS
---HOW TO DETECT TOXIC VAPORS---
SOUND SENSE ABOUT FIRE DOORS

There's no Fuss 'n Fume here....

IN the modern plating rooms at the S. E. Overton Co., South Haven, Michigan, thousands of metal picture frames are cleaned and plated each day. And because KIRK & BLUM Plating Tanks are coupled to an efficient KIRK & BLUM Fume Removal System, there's no "fuss and fumes." Production consistently betters older records . . . there are no complaints from the workmen . . . valuable equipment is protected from the effects of acid fumes.

A Kirk and Blum Engineer will be glad to show you other photos and data, even arrange a trip to a nearby KIRK & BLUM equipped shop and explain how you can get more profit from plating operations. Write for Catalog "Fan Systems for Various Industries."—The Kirk & Blum Manufacturing Co., *2802* Spring Grove Avenue, Cincinnati 25, Ohio.

FOR CLEAN AIR . . . THE INVISIBLE *TOOL*

KIRK AND BLUM

FUME CONTROL SYSTEMS

Whatever your plating process . . . various acids, hand operation, semi - automatic or automatic . . . there is a KIRK & BLUM Fume Removal System to make your plating shop more workable, more profitable.

USE LITTELL *Pres-Vac* SAFETY FEEDERS

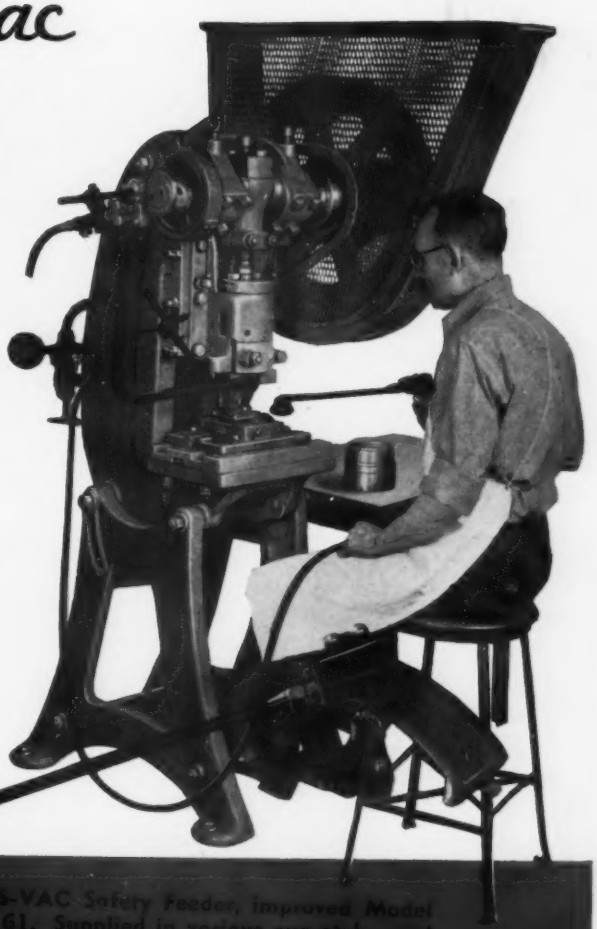
SAVE HANDS AND FINGERS!

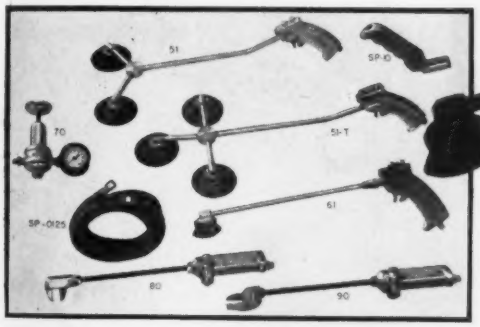
Operators sometimes forget, but punch presses never do. Your workman's first mistake with a finger is his last with it.

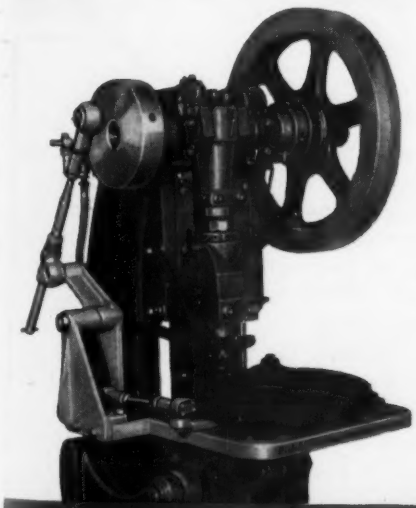
Protect your men against amputations. Protect yourself against lost time, medical bills, and high insurance costs. Install sensible, job-proven Littell **Pres-Vac** Safety Feeders. Then watch your press room morale shoot up, your accident rate drop down.

The **Pres-Vac** Safety Feeder enables a man securely to grip and feed dry or oily metal parts. He need never place his hands between the punch and die.

The **Pres-Vac** Safety Feeder operates successfully because of the magic venturi. This device converts a tiny stream of compressed air into a strong vacuum. The vacuum is released by a convenient trigger. The air is used only while feeder is used, and then in small amounts. 45 lb. air pressure develops a 20" vacuum—66-2/3% perfect, which is 70 lbs. vacuum pickup, using 3" cup—ample to pick up the heaviest pieces.







PRES-VAC Safety Feeder, Improved Model No. 61. Supplied in various cup styles and sizes, as needed.

No. 51. PRES-VAC Double Cup Feeder, for pieces with a hole in the center. No. 70 Pressure Regulator. Nos. 80 and 90 Mechanical Pickers. Operated from air line. Aluminum jaws cannot damage punch or die if accidentally caught in the press.

HERE ARE TWO MORE LITTELL SAFETY DEVICES

1. LITTELL Air-Blast Valves
   A short blast of air automatically ejects pieces from the die. This permits the operator to concentrate on loading the die. Valve operates only during 1/6 the complete cycle, saving air. Easily adjustable or removable, with ball and universal joint.

2. LITTELL Punch Press Dial Feeds
   Operator never places hands beneath the punch. He drops the parts to be assembled into the outermost die on the dial plate. Dial automatically carries the work beneath the punch. Operates up to 60 strokes per min. 100% perfect safety combined with 200% increase in production!

Littell makes a complete line of accessory equipment

WRITE FOR FULL DETAILS

F. J. LITTELL MACHINE CO.

4109 RAVENSWOOD AVE., CHICAGO 13, ILL.

A Great Seller

...because it's a Comfortable Eye-Protector!

AO F-9200 Acetate Goggle

When we brought it out, we were sure there was a great future ahead for this goggle of non-flammable cellulose acetate butyrate—but its popularity has surprised even ourselves! Here are its features that workers appreciate:

1. ASSURED PROTECTION.
2. Hinges and temples out of line of sight.
3. Smarter appearance.
4. Lenses that conform to and cover eye orbit.
5. Improved fit.
6. Comfortable, lightweight, face-formed bridge.
7. Nosepads which distribute goggle weight *evenly.*

This goggle does a prime protection job on operations in chemical and electrical plants where the tiniest spark might cause fire or explosion. Because of its acetate construction it is especially recommended for these and similar jobs where metal goggles might not be recommended. Available with ventilated side shields for added safety against lateral-striking objects. Lenses are 6-Curve Super Armorplate. When protection from glare, ultraviolet or infra-red radiations is a "must", specify Calobar lenses. For a handy source of supply, see the AO representative. There is always one near you.

Safety Division of

American Optical COMPANY

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

Supreme Achievement

THE LEMNIAN
BRONZE ATHENA

BY PHEIDIAS

Born at Athens about 500 B. C.

"Pheidias is universally regarded as the greatest of Greek sculptors. Demetrius calls his statues sublime."[1] "The Lemnian 'Athena' —a bronze which ancient connoisseurs preferred to all others —roused the enthusiasm of the subtle critic Lucian, and which Pausaneas calls the best of all Pheidias' creations."[2] As the magnificent skill of Pheidias remains unequalled, so has Paxlanosav Heavy Duty through the years maintained its commanding position among all skin cleansers for its unsurpassed quality, efficiency and safety.

[1] Encyclopaedia Britannica
[2] "Masterpieces of Greek Sculpture" by A. Furtwangler

PAX®

PAXLANOSAV HEAVY DUTY GRANULATED SKIN CLEANSER

There is Nothing Finer For All General Occupational Skin Cleansing

PAXLANOSAV* — a superior skin emollient combines lanolin and other special skin normalizers. Its use promotes healthy, singing hands.

48-G

ADVERTISED IN AMERICAN MEDICAL ASSOCIATION PUBLICATIONS

G. H. PACKWOOD MANUFACTURING CO.
Manufacturers of Fine Industrial Skin Cleansers
1545-55 TOWER GROVE AVE. • ST. LOUIS 10, MO.

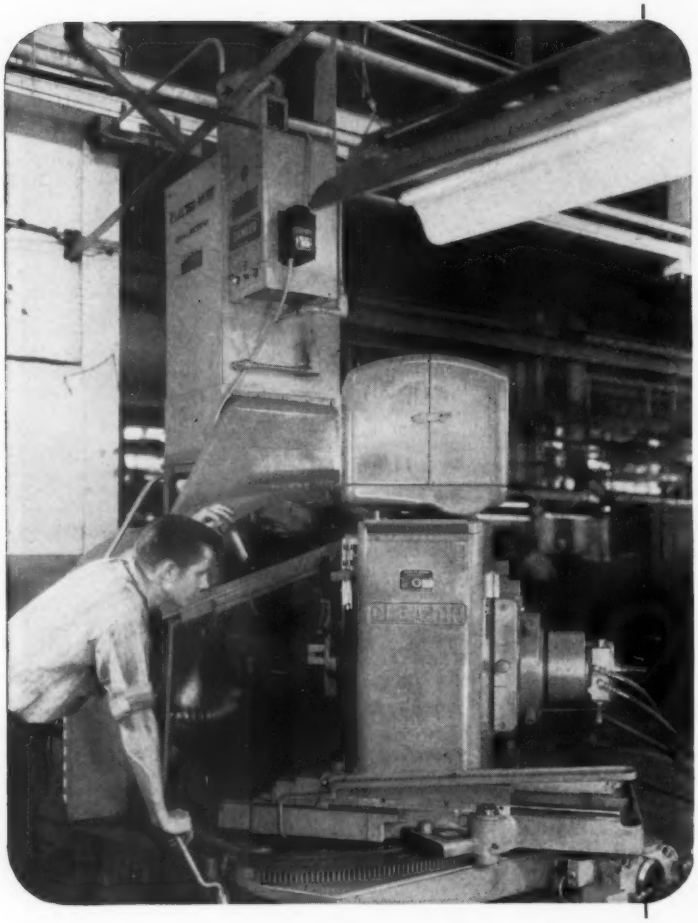
PAXLANOSAV HEAVY DUTY Granulated Skin Cleanser has integrally formulated with each granule, exclusive PAX developed PAXLANOSAV EMOLLIENT which combines more than 3% anhydrous USP lanolin plus additional liberal percentages of other fine skin normalizers. Compared to lanolin alone, PAXLANOSAV is a markedly superior skin emollient for use in a skin cleanser because, in addition to being more effective, an adequate quantity of PAXLANOSAV remains on the skin after washing to protect the natural acid mantle of the skin. PAXLANOSAV HEAVY DUTY does not contain synthetic detergents, and its bulk and unusual cleansing efficiency assure outstanding economy in use. It also quickly develops exceptionally profuse lather, remains free flowing, and can be easily used in any good commercial granulated or powdered soap dispenser.

REGISTERED TRADEMARK REG. U. S. PAT. OFF.

*Tradename of G. H. Packwood Mfg. Co.

PAX HYSPEED has also gained national acceptance because of its outstanding efficiency, safety and economical bulk which have made it the quality but inexpensive leader among all granulated skin cleansers made without an emollient.

Electro-MIST removes a hazard from high speed machining



Oil "Smog" is controlled effectively by modern AAF Electronic Collector

GEAR-CUTTING machines operating at high speeds throw off a penetrating "smog" made up of oil and smoke. It's a dangerous by-product that hampers worker visibility, results in unsightly deposits of an oily film on walls and equipment that constitutes both a fire hazard and maintenance problem. But this Gleason gear-cutting machine pictured at left is "smog-free", thanks to an AAF Electro-Mist.

AAF Electro-Mist, the electronic oil mist and smoke collector, is suspended above the cutting machine. The oil-laden "smog" is drawn directly into the collector. Smoke, oil and the smallest impurities are removed by electronic and mechanical filtration. The results? Time spent in maintenance and cleaning is cut—danger of fire is reduced—worker visibility is improved—more healthful operating conditions are created and the cleaned air can be returned directly to the work room.

And Electro-Mist pays its own way! As much as two to five gallons of oil can be salvaged daily and piped back into the machine or drained off.

AAF Electro-Mist is a self-contained and demountable unit. Removable plate assemblies allow cleaning of collector plates at convenient locations. The unit is designed for floor or overhead mounting. Ask your local AAF representative for Bulletin No. 251 or write direct to—

AMERICAN AIR FILTER COMPANY, INC.
366 Central Ave., Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

AAF
AIR FILTERS
AND DUST CONTROL EQUIPMENT

Do you have any questions, theories or ideas concerning industrial health or safety? If you want to give them a good airing—send 'em along. We'll publish all space permits.

Unusual Accident

OCCUPATIONAL HAZARDS:

We recently had an unusual occurance which might be of interest to you. I do not recall of ever having seen exactly the same circumstances, and it occurred to me that other companies might be interested in our experience.

One of our Bindery employees was cleaning the ink from the rollers of his book cover stamping press with cleaning solvent. The rollers had been removed from the press and were lying on a cleaning pan on the floor. The solution was poured from a safety can on a rag for wiping the rollers. The employee, in bending over, dropped a cigarette lighter from his pocket, the lighter striking the floor in such a manner as to cause the flint to spark and ignite the rags with the cleaning solvent.

The resulting blaze was only a small one, and the fire quickly extinguished by the quick thinking of the employee.

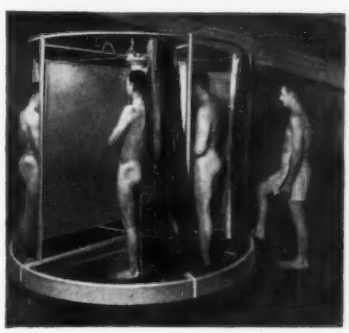
This incident seems unusual to us and does prove that strange and unexpected things can happen to cause accidents or near accidents.—Kenneth Y. Umberger, Personnel & Safety Director, Kingsport Press, Inc., Kingsport, Tenn.

Fire Section

OCCUPATIONAL HAZARDS:

I would very much like to have your publication, OCCUPATIONAL HAZARDS. It is a most interesting book and certainly educational. I usually get a glimpse of the one sent to the Chief, but I would like to have a book shelf of my own on these matters and two or three of the back numbers would be appreciated.—George Sweeting, Calgary Fire Department, Calgary, Alberta, Canada.

INCLUDE
SHOWERS IN THE MODERN WASHROOM

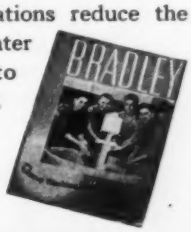


• Alert plant executives know that sanitary wash facilities, to be complete, should include showers. Efficiency and employee morale are definitely improved when the convenience of clean, health-protecting showers are made available.

Bradley Multi-Stall Showers combine the benefits of economy and easy installation with sturdy construction and maximum sanitation.

Available in 5- or 3-Stall Units, Bradleys can be quickly installed in either old or new buildings, on any kind of floor including wood. Bradleys have no corners or dark areas to collect dirt, and upkeep requires a minimum of attention.

For further details on how Bradley installations reduce the number of piping connections needed, cut hot water costs and reduce water consumption, write to BRADLEY WASHFOUNTAIN CO., 2217 W. Michigan Street, Milwaukee 1, Wisconsin.



Illustrated Catalog 4701 includes helpful layout suggestions, - a copy sent promptly upon request.

Distributed Through Plumbing Wholesalers

BRADLEY *multi-stall showers*

— A *Finnell* SCRUBBER-VACUUM DOES ALL . . . at BIG Savings in Labor Costs!

Clean floors—so important to worker safety and morale—reflect good management. Large-area floors that are cleaned with a *Finnell Combination Scrubber-Vacuum* reflect good management for still another reason. They tell a story of big savings effected in labor costs. For example, the *Finnell Scrubber-Vacuum* illustrated above, with one or two operators, does a cleaning job better in half the time it takes a crew of six to eight using separate equipment for scrubbing and picking up. This *Self-Propelled Finnell* is a complete cleaning unit *all in one*—it applies the cleanser, scrubs, rinses if required, and picks up. Has a cleaning capacity up to 8,750 sq. ft. per hour!

Finnell offers several *Combination Scrubber-Vacuum Machines*, and also a full line of *Portable Floor-Maintenance Machines*. In fact, *Finnell* makes equipment for every type of floor care—wet scrubbing, dry scrubbing, dry cleaning, waxing, and polishing—and in sizes designed to fit specific needs. *Finnell* also makes a full line of *Cleansers* specially developed for the greater speed of mechanical scrubbing . . . and *Sealers*, *Waxes*, and *Accessories* for every need.

The nearby *Finnell Floor Specialist and Engineer* is readily available for free floor survey, demonstration, or consultation . . . and for training your maintenance operators in the proper use of *Finnell* equipment. Phone or write nearest *Finnell* branch or Finnell System, Inc., 3507 East St., Elkhart, Ind. Canadian Office: Ottawa, Ont.

Everything FINNELL for Floor Care

FINNELL SYSTEM, INC.

Pioneers and Specialists in

FLOOR-MAINTENANCE EQUIPMENT AND SUPPLIES

BRANCHES IN ALL PRINCIPAL CITIES

Occupational HAZARDS

VOLUME 10 • No. 9

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DIE CASTINGS
APPLIED HYDRAULICS
INDUSTRY AND WELDING
THE TAXICAB INDUSTRY
THE REFRIGERATION INDUSTRY

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Our AT & T Teletypewriter Number is CV-233.

Eastern Office — 19-25 West 44th St., New York 18, New York, Murray Hill 7-3420.

Chicago Office—64 East Lake St. Room 1013, Chicago 1, Illinois, Andover 4972.

By SUBSCRIPTION, one year, $2.00. Single copies, 25 cents. Canada: One year, $3.50. Foreign: One year, $4.00.

VISUAL EFFICIENCY

FIRST STEP TO SAFETY

The Bausch & Lomb Industrial Vision Service offers a proved fact-finding method for accident reduction through scientific visual classification

WHAT are the characteristics which distinguish accident-prone workers from those with perfect safety records? Industrial psychologists have set up correlations on the basis of many physical and mental capacities. One of the most dependable and easy-to-prove is *visual performance.*

The Bausch & Lomb Industrial Vision Service is the result of more than eight years of scientific research in industry, under the auspices of the Industrial Vision Institute of Purdue University. It is an easily-administered system which can be installed in your plant. By scientific methods, the visual skills of employees are measured. From factual data secured, visual standards are determined for each job. Against these standards are compared the visual skills of present and prospective employees. Those failing to meet the standards are recommended for professional eye care.

The results, proved in dozens of plants in many industries, are lowered accident records, increased production per worker, improved quality, lower training costs and less labor turnover. Wouldn't you like to be able to recommend a program with these advantages for your plant?

BAUSCH & LOMB

OPTICAL COMPANY ROCHESTER 2, N. Y.

SEND FOR BOOKLET OF FACTS YOU CAN'T AFFORD TO MISS

Industrial Vision Department
Bausch & Lomb Optical Co.
745-T St. Paul St., Rochester 2, N. Y.

Please send me a copy of "Vision in Industry" and details of the Bausch & Lomb Industrial Vision Service.

NAME.....

TITLE.....

COMPANY.....

STREET.....

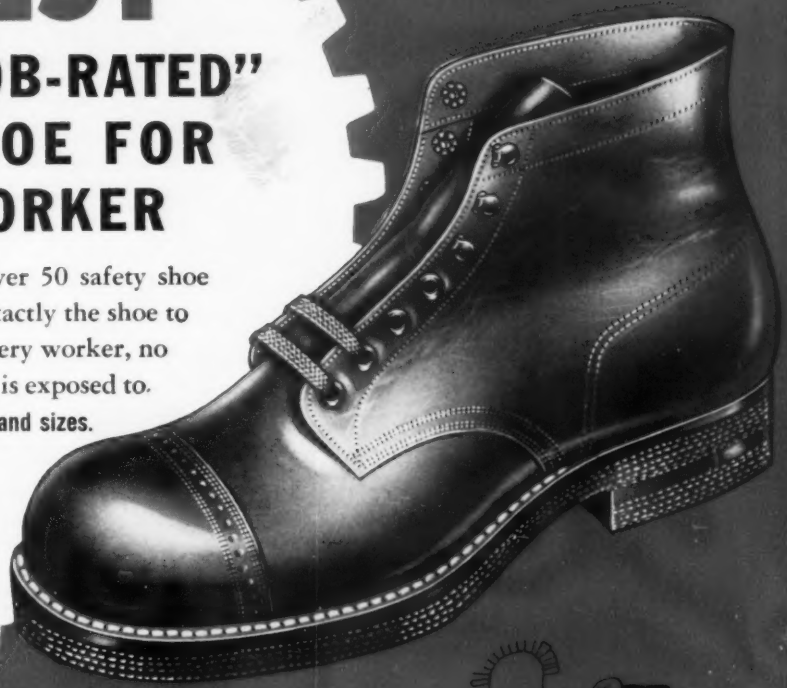
CITY..... STATE.....

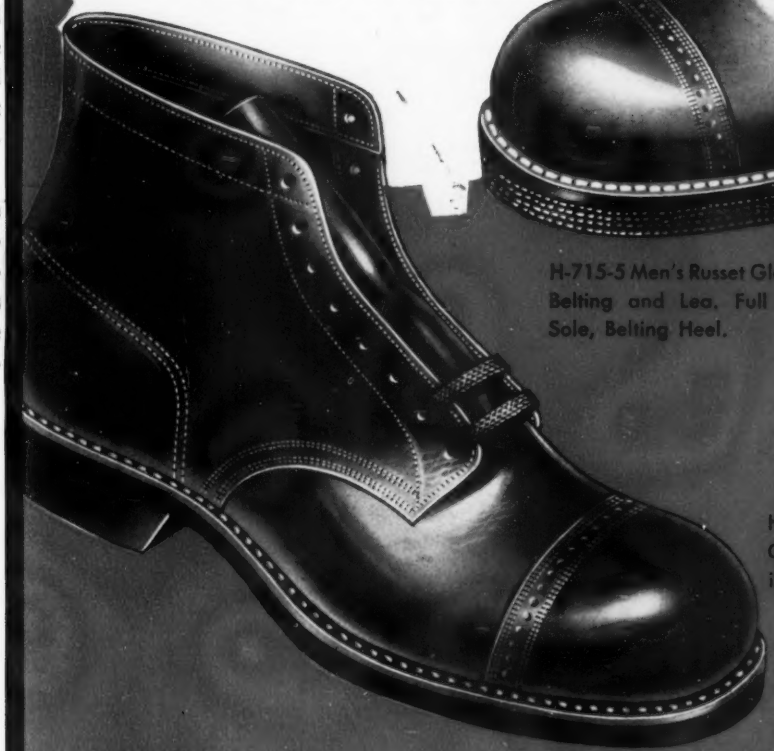
HY-TEST

OFFERS A "JOB-RATED" SAFETY SHOE FOR EVERY WORKER

In Hy-Test's selection of over 50 safety shoe types, you are sure to find exactly the shoe to meet the specific needs of every worker, no matter what foot hazards he is exposed to.

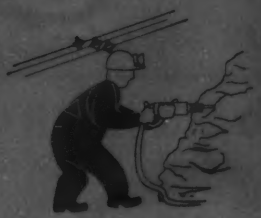
Complete range of widths and sizes.





H-715-5 Men's Russet Glove Blu., Belting and Lea. Full Double Sole, Belting Heel.

H-724 Men's Blk. Glove Blu., Comp. sole and heel (heel vulcanized). No metal except steel toe.



Insure Workers Feet In Sure Protection

with HY-TEST *Safety Shoes*

THE WORLD'S LARGEST SELLING SAFETY SHOE

HY-TEST SAFETY SHOES

TEST DIV. • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MO. • EASTERN OFFICE • MANCHESTER, N. H.

NEW CESCO CATALOG

tells you Where to use . . . How to use . . . and How to Select Industrial Protective Equipment

This **NEW** 64-page CESCO Catalog is "industry's guide for accident reduction." That's what the men who have seen it say. It's the most complete, most informative book of its kind. In addition to a full showing of CESCO products, this new book contains technically informative yet easy-to-read pages especially written for every man who wants to know the best safety procedures. All facts are based on reports from impartial experts. Much of the information applies to all protective equipment, regardless of make.

64 PAGES *of ammunition against industrial accidents! Sixteen pages explaining correct safety procedures . . . over 150 protective items are illustrated and described throughout the book.*

Here's a sample spread from this outstanding new CESCO Catalog . . .

GET YOUR FREE COPY NOW!

Simply write Chicago Eye Shield Company or your CESCO distributor, on your company letterhead. Your copy of this new guide to greater safety will be sent to you promptly.

CHICAGO EYE SHIELD CO.
2312 Warren Boulevard, Chicago 12, Illinois

OFFICES IN Boston, Buffalo, Cincinnati, Cleveland, Columbus, Detroit, East Orange, Houston, Los Angeles, Montreal, Pittsburgh, Seattle, St. Louis, St. Paul, Toledo, Tulsa

CESCO FOR SAFETY

EYE HAZARD SIGNS

NOTICE
ALL PERSONS WORKING IN THIS DEPARTMENT — MUST — WEAR GOGGLES
SAVE YOUR EYES WEAR GOGGLES
SAFETY FIRST
WEAR GOGGLES OR USE SHIELD
DANGER
WEAR GOGGLES WHEN CHIPPING OR GRINDING
CAUTION
WEAR GOGGLES WHEN USING THIS MACHINE

You'd think men would be most careful to safeguard a priceless possession . . . their sight.

Yet they take chances with their eyes . . . neglect to wear goggles on hazardous jobs or risk loss of sight in other ways.

STONEHOUSE SIGNS

FOR ACCIDENT PREVENTION

Drive Home the Warning . . .

"SAVE YOUR EYES"

In Stonehouse Catalog No. 8 there are many Eye Hazard signs. It's Free on request.

Stonehouse SIGNS, INC.
MANUFACTURERS

"SIGNS SINCE 1863" 842 LARIMER ST. DENVER 4, COLO.

ACCIDENT PREVENTION SIGNS IN STANDARD COLORS AND DESIGNS

Proven in the Pacific Jungles

FOR DERMATOPHYTOSIS

Vodisan - Vodust

SOLUSALVE POWDER

The active ingredient of Vodisan and Vodust, Hycloromane (dihydroxydichlorodiphenylmethane), was first proven effective in the jungles of the South Pacific in combating fungous rot on cloth fabrics. Now *in vivo* and *in vitro* studies have proven it to be effective against fungous infections of the skin.

Hycloromane, a proven fungicidal agent, is now available as VODISAN (Hycloromane in Solusalve) for nighttime use and VODUST (Hycloromane with India talc) for daytime use in the treatment of athlete's foot and other mycotic infections.

AROUND THE CLOCK TREATMENT

Vodisan Solusalve-Vodust Powder, the combined day-night treatment for dermatophytosis and many other fungous infections, exerts continuous fungistatic and bacteriostatic actions while being safe, nonirritating and noninjurious to the skin.

Vodine Company

407 SOUTH DEARBORN STREET, CHICAGO 5, ILLINOIS

A NEW REASON* WHY YOU'LL PREFER Safe-T-vis

Announcing The "A-100" Acetate Frame Goggle

Here are the established reasons for preferring SAFE-T-VIS goggles

SAFE

Withstands drop of 7/8" steel ball from 200".

COMFORTABLE

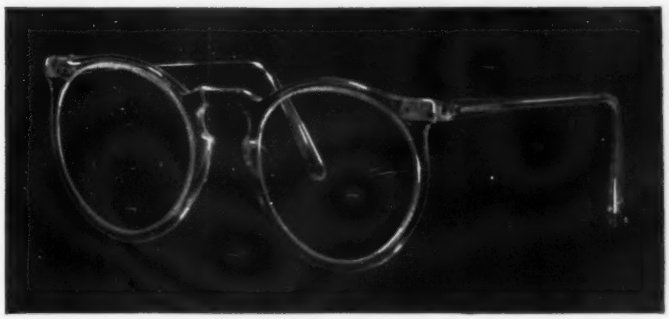
50% lighter than glass safety lenses. Workers will wear them 8 hours per day.

DURABLE

The lenses are made from a *new, highly scratch-resistant plastic material.*

PRACTICAL

Resistant to sparks and pitting, chemical fogging, molten metals and most acids.



You'll be praised for introducing the newest in protective spectacles to your workers . . . They're handsome in appearance, strong in construction and Safe-T-vis lenses are the safest development in industrial eyewear.

The clear acetate frame of the "A-100" is practical on every operation where spectacle type eye protection is indicated . . . and particularly useful on operations where metal frames corrode, or sparking of metal frames might cause an explosion hazard.

The "A-100" is available in a full range of standard sizes, on an excellent delivery basis.

Safe-T-vis quality is *Univis Lens* quality, recognized as the finest in its field for nearly a quarter of a century.

For free booklet covering complete line of Safe-T-vis Protective Spectacles, address

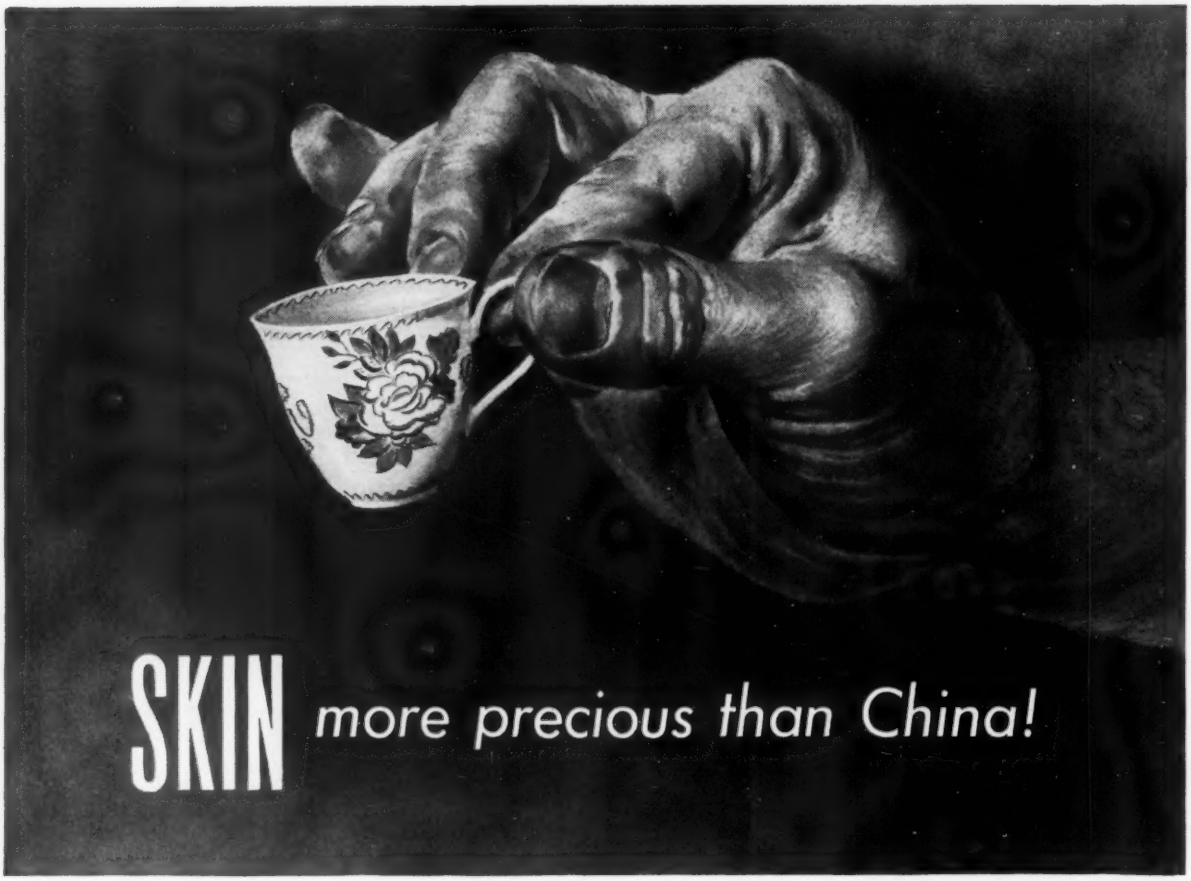
THE UNIVIS LENS COMPANY, Dept. O, Dayton 1, Ohio

Safe-T-vis

8-hour Protection
8-hour Comfort

Lightweight protective spectacles

A product of THE UNIVIS LENS COMPANY, Dayton 1, Ohio



They're more precious to industry than all the china in the universe. But like china, workers' hands are readily vulnerable to damage. Skin-injuring industrial operations and chemical irritants in your plant see to *that!*

While you can't always avoid exposure to these dangers, you *can* help safeguard skin against the ailments caused by them. Simply have your workers gently rub the proper West Protective Cream on their skin before they start work. Thus, they are assured of *safe, smooth, lasting protection.*

Since they are scientifically prepared, industry everywhere finds West Protective Creams effective precautions against nearly every dermatitis hazard that comes to mind. These creams come in six different types—and either penetrate the skin or remain on the surface—according to the special type of protection required.

To keep your workers safer on the job—and production efficiency up—consult one of almost 500 trained West Representatives from coast-to-coast. He's fully qualified to explain the advantages of these highly effective West Protective Creams.

Send for Free Chart

PRODUCTS THAT PROMOTE SANITATION

WEST DISINFECTING Company

42-16 West Street, Long Island City 1, N. Y.

Here's a study that furnishes a yardstick in computing cost of injuries...

HOW DO YOUR COSTS COMPARE WITH THESE?

Part 5

Amputations...$825.04

This article, fifth in a series concerning actual costs of typical industrial accidents at the Peoria plant of Le Tourneau, Inc., explains why amputations cost the employer more money than any other type of industrial accident. Here again is found conclusive proof that the methods used to prevent accidents are much less expensive than allowing them to happen—proof that "there is profit in prevention!"

PAUL WINDSOR, director of safety at the Peoria plant of Le Tourneau, Inc., conducted an extensive four-year survey to determine actual costs to his employer of common occupational injuries occurring at the plant. Since March, OCCUPATIONAL HAZARDS magazine has been giving its readers the exclusive story of this important report. The methods Mr. Windsor used to arrive at these costs were explained to readers of this magazine in the March issue. Some of the sources used were first aid accident reports, final report and settlement receipts of the insurance department, and records kept by a safety engineer through observing and timing nurses attending injured employees, and observing and timing injured employees waiting for or receiving medical service. In the April issue the figures used to arrive at the final cost of dermatitis cases ($28.03) was discussed. In May, the cost of foot or toe injury ($32.06) was featured and in June the $16.29 cost to the employer of eye injuries was brought out. This month the most expensive type of injury found in Mr. Windsor's report is brought to the attention of our readers.

The 10 cases of amputation of a member, or part of a member, included in Mr. Windsor's study included 9 finger injuries and one hand injury, in which 100 per cent of the loss of that member was sustained.

Data shows that only 7 cases made first aid calls on employer's time and all but one case shows one or more calls made on the employee's time. This is explained by the number of working days absent during which time calls were made for redressings and doctor's services. Seven of the 10 cases show employer's time lost. The range was from

(Turn to Page 38)

COSTS IN DOLLARS, TO THE EMPLOYER, OF AMPUTATIONS

Dept. No.	Time Lost by Employee	Overhead	Administration	Medical Expense							Compensation	Disability	Grand Total Cost
				Nurse's Time	Doctor's Services Excluding Operations Casts	Operations Sutures Casts, etc.	Medicine and Bandage	Hospital	Transportation	Total			
103	.....	.....	3.98	.874	19.50	14.16	.264	226.55	7.00	268.35	201.49	2997.10	3470.92
084	39.10	75.52	3.98	2.674	19.50	7.08	.912	41.01	.85	72.18	34.91	658.00	883.54
105	9.02	22.07	3.98	2.114	18.00	7.08	.744	20.00	.....	47.94	32.74	634.68	750.43
110	1.56	3.50	3.98	1.894	18.00	7.08	.744	39.17	.....	66.89	94.00	423.00	592.93
084	8.19	15.82	3.98	1.174	9.00	7.08	.456	14.92	.....	32.63	.....	528.90	589.52
112	7.50	16.80	3.98	1.174	10.50	7.08	.456	22.51	.....	41.72	.....	352.60	422.60
132	.....	.....	3.98	.274	4.50	7.08	.096	24.53	.....	36.48	22.67	352.60	415.73
057	20.63	39.75	3.98	3.094	22.50	7.08	1.200	6.00	.....	39.87	.....	308.53	412.76
102	.....	.....	3.98	.694	15.50	.....	.240	4.00	.85	21.28	75.56	264.46	365.28
224	14.74	28.46	3.98	2.254	13.50	7.08	.888	11.75	.85	36.32	.....	263.20	346.70
Average	$10.07	$20.19	$3.98	$1.62	$15.05	$7.08	$.60	$41.04		$66.37		$678.31	$825.04

SAFE HANDLIN

The complete "Safe Handling of Gasoline" exhibit.

SINCE January, 1947, five mobile units of the Ethyl Corporation have "hit the road" a total of 87,374 miles to present their unusual and highly effective fuel-handling safety show before 21,000 executives and employees in nearly 400 refineries throughout the United States and Canada.

The five "road companies" are under the overall supervision of Ellis K. Locher, assistant manager of safety for Ethyl Corporation. Each unit, consisting of an Ethyl safety engineer and his assistant, presents a series of simplified demonstrations which dramatically illustrate the fire and explosive power of gasoline, as well as its hazards when used or handled improperly.

Though the story of safe handling of gasoline has been told over and over again, Ethyl's new mobile show has an appeal of its own because of the manner in which the story is presented. The hour-long show is a highly dramatic demonstration. Novel pieces of custom-built equipment, including miniature tank models, test-tubes, beakers, meters and ballons dramatize the enherent hazards of gasoline and the methods used to make its handling safe to all. Several Ethyl engineers worked on the preparation of the show for nearly a year before it was relcased. So complete were their preparations that the show is completely fireproof, a precaution that extends even to the coat worn by the Ethyl representative in charge.

Theme of the Show

Throughout the show, the point is stressed that the same characteristics of gasoline which make it such a useful source of power at the same time create its greatest hazard. These characteristics, of course, are its high heat energy and its volatility. As everyone knows, coal, wood and kerosene also possess great heat energy, but they must first be heated themselves before they give off sufficient vapors to ignite and burn. This is not the case with gasoline. Because of its high volitility, gasoline vaporizes at ordinary temperatures and pressures, and thus need not be heated before its vapors will burn. This is a highly desirable

Here's the Show, packed and ready for transportation to every territory in the United States, where Ethyl Corporation safety engineers will make the complete demonstrations as a service to the oil industry.

F GASOLINE

Service to the petroleum industry, through customer companies, has been a keystone of the Ethyl Corporation for 22 years. Extensive research programs and many comprehensive field services are important phases of their many activities. And now, as a further service contribution to the industry, Ethyl has prepared a new, mobile production—a popular "road show"—which reviews in unique manner the know-how of handling gasoline safely.

Ellis K. Locher
The man behind the show . . .

quality in a motor fuel, making for quick starts and rapid acceleration, among other advantages. But from the safety standpoint, this same characteristic calls for competent attention at all times in the handling of gasoline.

The Ethyl show reviews, in several demonstrations, both the power of gasoline and its separate hazards. In its liquid form, gasoline presents a distinct kind of hazard, and should not, of course, be swallowed or allowed to come in contact with the skin for a prolonged period of time. As a vapor, gasoline represents both a fire and explosion hazard, and also is toxic to the human body if sufficient quantities are inhaled.

When a fire occurs, it is the gasoline vapor-air mixture and not the gasoline itself which actually burns. But before that fire can result, it is explained, the gasoline vapor-air mixture must be within the so-called combustible range, meaning a certain percentage of gasoline vapors in proportion to the amount of air present. If outside this range, the mixture is either too "rich" or too "lean" to sustain fire, as the case may be.

By the same token, it is emphasized how relatively little gasoline is required to establish a hazardous condition in a tank or drum. For example, it is pointed out, a single gallon of gasoline completely vaporized forms 30 cubic feet of concentrated vapor. This amount of vaporized gasoline mixed with the air in a small bulk plant tank of the approximate volume of 3,000 cubic feet (a 20,000-gallon tank) would be enough to place that tank in the explosive range. This is stressed the fact that a so-called "empty" tank may be a greater potential hazard than the tank which is filled or partly filled with liquid gasoline. In the latter case, the vapors which form above the liquid gasoline stored in a tank are usually "too rich" to ignite.

An effective demonstration in the show points up the hazards of gasoline vapors from the standpoint that they are colorless and heavier than air. A few drops of gasoline are sprinkled onto a dry rag and the rag is placed in a deep pan, from which extends a glass tube, open at both ends and angled downward. A cigarette lighter is placed at the mouth of the lower end of the tube. Onlookers cannot see the colorless gasoline vapors flowing down the tube from the dampened rag, but within a few moments the vapors are ignited by the lighter, and the flame travels back up the tube, setting fire to the cloth in the pan.

Because of their tendency to flow downward and settle in low places,

(Continued to Page 30)

Carbon dioxide being poured over burning gasoline. This immediately smothers the fire by shutting off oxygen.

Demonstration proving that gasoline will not ignite without oxygen being present.

Are you sure at all times that those vapors in your plant do not present a health hazard? Are you equally sure they are not an explosion hazard? Here's an article that explains in simple terms how to get the right answers to these important questions.

ARE THOSE VAPORS TOXIC?

by
F. R. DAVIS, JR.
Davis Emergency Equipment Co., Inc.

THE analysis of toxic substances in the field is a job for technically trained personnel and usually requires the use of complicated bulky equipment and laboratory technique. Few persons are adequately trained for this type of work. These persons are usually found in the state or city health departments, large industries and insurance companies. But by and large, the personnel available for the analysis of toxic substances is quite limited—especially when we consider the multitude of daily applications of thousands of substances.

The reason for this condition is, I believe, quite simple. It is the lack of education along this line as well as the lack of simple devices to be used by non-technical personnel to adequately make analyses in the field.

It was not so many years ago that the petroleum industry had an analysis problem of this kind. They were working with combustible products every day, yet they knew very little about their various characteristics. Fires and explosions were not uncommon and most of the time the cause of such accidents remained a mystery.

When was a tank full of explosive or toxic gases? When was it safe enough to enter and do necessary repair work without endangering life, limb and property? Only the laboratory could answer these questions for the operators and obtaining the answer took many hours in most cases. Thus time would be wasted by other employees and the procedure was considered wasted economy. A method had to be devised which would indicate whether a combustible gas was present—a method that would be quick, simple to operate, safe and reliable. And a method which could be used periodically on the job to see if the condition was changing.

Out of this problem was born the development of the first combustible gas indicator which is in daily use all over the world today. It was a portable battery operated device which non-technical personnel could operate simply and safely to indicate the presence of any gas which would burn or explode.

This was the start of reliable portable gas analysis equipment. As the petroleum industry became more complex, so did the products which they turned out. Many of these substances are highly flammable and/or toxic. The flammable limits are always known but the toxic limits are considerably harder to determine.

Before we go deeper into the determination of these various substances, as far as their toxic limits are concerned, let us try to put them into a few simple categories so that the non-technical person may have a better understanding of the problem.

1. GAS—A gas is that which regardless of temperature remains in same form or gaseous state. Some typical examples are the gas we use for cooking and hydrogen.

2. VAPOR—A substance which comes off a liquid at elevated temperatures in a gaseous form. Typical examples: vapors coming off gasoline, kerosene and naphtha. These vapors start to come off at various temperatures and the higher the temperature the more the vapor. If these liquids remained at elevated temperature eventually all the liquid would go into the vapor state. Yet these same liquids could be cooled to a point where there would be almost no vaporization.

3. FUMES—There are actually fine particles of the basic material floating in air. These are too fine to see, yet they can be usually detected through sense of smell. Example of this would be sulphur fumes and metal fumes such as lead or mercury.

4. DUST—An accumulation of fine particles floating in the air. Their origin is from something solid and are put into a dust state by abrasion. Example: silica, asbestos and lead.

In this article we are interested only in the amount of each substance which is considered toxic if the exposure is continuous over an eight hour day. This figure is generally known as the maximum allowable concentration of MAC.

The origin of the MAC for various substances varies. Even today there are differences between many author-

TOXICITY TABLE

Gases or Vapors	Maximum Allowable Concentration	Authority
Acetone	500 P.P.M.	California
Acrolein	1 PP.M.	N. J.
Acrylonitrile	20 PP.M.	N. J.
Ammonia	100 P.P.M.	N. J. & Mass.
Amyl Acetate	200 P.P.M.	N. J. & Mass.
Amyl Alcohol	55 P.P.M.	Flury
Aniline	5 P.P.M.	N. J. & Mass.
Arsine	.05 P.P.M.	N. J. & Mass.
Benzene (Benzol)	35 P.P.M.	N. J.
Bromine	.15 P.P.M.	Dalla Valle
Butanol	100 P.P.M.	California
Butyl Acetate	200 P.P.M.	N. J. & Mass.
Butyl Alcohol	200 P.P.M.	N. J.
Carbon Disulfide	20 P.P.M.	N. J.
	15 P.P.M.	Mass.
	1 P.P.M.	Calif.
Carbon Monoxide	100 P.P.M.	N. J. & Mass.
Carbon Tetrachloride	50 P.P.M.	N. J. & Mass.
Cellosolve	500 P.P.M.	Dalla Valle
Chloroform	100 P.P.M.	California
Chlorine	1 P.P.M.	Massachusetts
Chlorodiphenyls	1 P.P.M.	Massachusetts
Chloronaphthalene	1-5 P.P.M.	Massachusetts
Dichloroethyl Ether	15 P.P.M.	Mass. & Calif
Dichloromethane	288 P.P.M.	Flury
Dichlorobenzene	75 P.P.M.	N. J. Mass & Cal.
Dimethylaniline	5 P.P.M.	N. J.
Dioxanes	1000 P.P.M.	N. J.
Ether	400 P.P.M.	Flury
Ethyl Acetate	139 P.P.M.	Mass.
Ethyl Alcohol	250 P.P.M.	Flury
Ethylbenzine	1000 P.P.M.	Calif.
Ethyl Bromide	2000 P.P.M.	Dalle Valle
Ethyl Chloride	20000 P.P.M.	9-10
Ethyl Ether	400 P.P.M.	Mass. & Calif.
Ethylene Dichloride	75 P.P.M.	N. J. & Mass.
Ethylene Oxide	250 P.P.M.	Dalla Valle
Ethyl Silicate	500 P.P.M.	12
Formaldehyde	5 P.P.M.	Mass.
Gasoline (Petroleum)	1000 P.P.M.	N. J. & Mass.
Hydrochloric Acid	10 P.P.M.	N. J. & Mass.
Hydrogen Chloride	10 P.P.M.	N. J. & Mass.
Hydrogen Cyanide	20 P.P.M.	N. J. & Mass.
Hydrogen Fluoride	1.5 P.P.M.	N. J. & Mass.
Hydrogen Sulfide	20 P.P.M.	N. J. & Mass.
Methyl Acetate	82 P.P.M.	Flury
Methyl Alcohol	200 P.P.M.	N. J. & Mass.
Methyl Bromide	100 P.P.M.	Dalla Valle
Methyl Chloride	500 P.P.M.	Calif.
Methylethyl Ketone	3000 P.P.M.	Dalla Valle
Methyl Formate	1500 P.P.M.	Dalla Valle
Methylpropyl Ketone	1500 P.P.M.	Dalla Valle
Monochlorobenzene	75 P.P.M.	Cal. N. J. & Mass.
Mononitrotoluene	5 P.P.M.	N. J.
Nitrobenzene	5 P.P.M.	N. J. & Mass.
Nitrous fumes	10 P.P.M.	Calif. & Mass.
Nitrogen Oxides	10 P.P.M.	N. J. & Mass.
Ozone	1 P.P.M.	Mass.
Pentachloroethane	2.4 P.P.M.	Flury
Perchloroethane	30900 P.P.M.	(Kills most animals in short time)
Petroleum Naphthas	1000 P.P.M.	N. J.
Phosgene	1 P.P.M.	N. J. & Mass.
Phosphorus Trichloride	.7 P.P.M.	3-6-7-23-32
Phosphine	1 P.P.M.	N. J.
Propyl Acetate	82 P.P.M.	Flury
Sulfur Dioxide	10 P.P.M.	N. J. & Mass.
Sulfur Trioxide	2 P.P.M.	3
Tetrachloroethane	5 P.P.M.	N. J. & Mass.
Tetrachloroethylene	200 P.P.M.	Calif. & Mass.
Toluene (Toluol)	200 P.P.M.	N. J. & Mass.
Toluidine	6 P.P.M.	6
Trichloroethylene	200 P.P.M.	N. J. & Mass.
Turpentine	200 P.P.M.	N. J. & Mass.
Vinyl Chloride	5000 P.P.M.	Dalla Valle
Xyline (Xylol)	200 P.P.M.	N.J. & Mass.
	100 P.P.M.	California

Portable instruments are available to analyze the majority of these gases in their toxic range. Manufacturers of such instruments: Davis Emergency Equipment Co., Industrial Instruments Co., Mine Safety Appliances Co.

ities. In general, the MAC was arrived at in this manner:

Some one became sick and the attending doctor attributed his sickness to the particular substance found in his patient's work. Samples of the atmosphere were taken from many locations at different times. These samples were analyzed in the laboratory and recorded in parts per million (PPM). Steps were then taken to either eliminate or reduce the offending substance. After many such analyses on the same substance, a figure was determined which was believed safe to work in. This figure may or may not be perfect, though we do know that it is possible to use that substance economically and keep the concentration below that point with no one suffered any injurious effects. Thus a MAC was determined—a safe and logical procedure.

However today we have improved on the technique. The manufacturer of a new product usually subjects animals to known concentrations until the animals begin to show some sort of symptoms. An autopsy is performed and the effect on various organs noted. From this information the hygienist can readily determine safe concentrations for the new product. Thanks to the industrial hygienists, you rarely hear of a new product causing any toxic condition unless that new product has been used incorrectly.

The continuous exchange of information between the industrial hygiene departments of various state, city, industries and insurance companies lends itself to less duplication of effort and greater progress in the knowledge of toxic limits and many substances heretofore unknown.

The industrial hygienist has been greatly handicapped because of analysis equipment for field use. Until just recently gas analysis in the field was almost impossible. A limited number of samples could be obtained, returned to the laboratory for tedious chemical analysis and the results obtained days later.

This method is obviously time-consuming and costly—the information sparse. The reason is quite simple. Hard as it is to believe, even in a closed room there are eddy currents. To prove this conclusively hold a lighted cigarette in your hand and watch the smoke go up—never straight, but always to one side or another.

Now, let's enlarge this simile and think of it in terms of taking samples in a flash for analysis back in the laboratory. We are taking samples from a degreasing tank. The vapors come off and are dispersed about the same way as the smoke from the cigarette. If the sample from the flask was taken in one location you might find no vapors, yet only two inches away there might be considerable quantities. I am not condemning the method but rather pointing out discrepancies which might lead to inaccurate results.

In order to overcome the difficulties in the present methods of gas analysis, portable instruments have been developed. As we have said before, the combustible gas indicator will analyze gas which will burn or explode. Many of these combustible gases are also toxic. To analyze them in terms of their toxic range, a special supersensitive gas indicator has been developed to combine both toxicity and combustibility in one instrument. With this type instrument, the non-technical man can easily determine toxicity and combustibility of substances. All that is necessary for the operator to know is the kind of vapor being tested. Readings on the meter give all the necessary information.

The inspection opening on this screw conveyor is screened to prevent the inspector from accidentally stepping into or putting his hand into the screw.

SALES FORCE FOR SAFETY

BY R. J. HEARING
Insurance and Welfare Agent
Columbia Cement Division
Pittsburgh Plate Glass Company

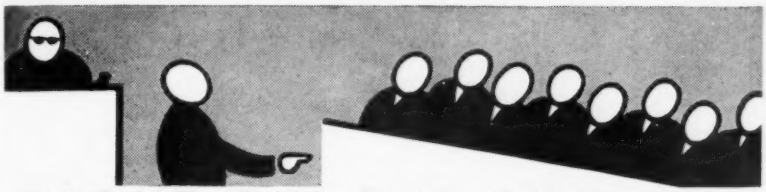
Even the best product must be advertised before it can be sold. Here's how one outfit gets down to brass tacks in selling safety.

IN organizing for safety we planned not only for the practical side of our program itself, but, in addition, we completely assembled a sales force to make certain that the product which we were so thoroughly sold on would be effectively presented to each and every one of our employees. Previous experience taught us that a safety program can only be as good as the number of people who actively participate in it. We knew we had a product to sell that was needed by everyone in the plant. We also knew that we had a potent sales factor in that our prospects could have our product without cost to themselves. We set out to *sell* safety to every member of our organization. Our sales volume is constantly increasing

At the close of 1946, our accident frequency and severity was alarmingly high. We had a safety program, but, at that time it was not given the impetus and importance that management desired. In order to put teeth in our program we painstakingly studied our safety situation in an effort to discover the cause as well as the cure. After careful consideration of all factors we set about to organize a sales force for safety. Nucleus of the sales force was our plant safety committee and our foremen's safety committee.

The plant safety committee is made up of one delegate from each department who serves for a period of three months. During each three-month period the committee is instructed and coached in the art of thinking, acting and selling safety to their fellow employees. The members of the committee also function as investigators who report on unsafe acts or conditions, anywhere in the plant, to the safety department. The committee

(Continued to Page 32)



RIGHT OFF THE DOCKET

The trend of litigation on workmen's health and accident compensation is reflected in these briefs on the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist. Clip cases and file for future reference.

Dish Washer Shot by Insane Man

TOM LOUIE was in the employ of the Bamboo Gardens, a restaurant, as a dish washer. He was casually acquainted with Fook Lee Hong, another Chinaman, who was not a patron of the Bamboo Gardens, nor a customer thereof, and who had never taken his meal there and was in no way interested therein.

On September 21, 1946, Hong and three other Chinese were arrested on a narcotic charge by officials of the United States and were subsequently charged and discharged. After his discharge from custody, Louie seemed to be laboring under the delusion that it was thought he had turned "State's Evidence" and that someone was going to kill him. He had told the United States District Attorney that members of a Tong society to which Tom Louie belonged, and to which Hong did not belong were going to import hatchet men to kill him because members of the tong thought he had turned State's evidence against his former companions on the narcotic charge.

Hong went into hiding for some days, at which time the District Attorney made an investigation and found there were no reasonable grounds for his suspicions that some one was going to kill him, but in his own mind he suffered the delusion that an attempt would be made upon his life.

One day while Tom Louie, the claimant, was taking water glasses from the kitchen to the serving table in the dining room, Hong entered the restaurant by the front door, carrying a loaded 38 caliber revolver, which he brandished in a threatening manner, and then shot it three times, one of which struck Tom Louie and severely injured him.

Claim was made to the Commission for recovery on the theory that injury was received while in the course of employment and arose out of such employment. There is no question that the accident arose while Tom Louie was in the course of his employment at the Bamboo Gardens. The sole question was whether said accidental injury arose out of said employment. There were no disputes as to the facts. There appears to be nothing in the record that at the time Hong came into the restaurant or at the time of firing the shot resulting in the accidental injury that Hong was in fact looking for Tom Louie or whether he had a real or imaginary grievance against him.

There is nothing to indicate in the record that Hong knew that Tom Louie was employed at the Bamboo Gardens; and the only manner in which Tom Louie seems to have been connected in the delusion is that Tom Louie was a member of the Tong society that Fook Lee Hong believed was going to import hatchet men to kill him.

The record justified the conclusion that the injury was a result of a risk to which claimant was subjected in the course of employment and to which he would not have been subjected had he not been so employed. Louie was injured not merely becouse he was a dish washer in the restaurant, but because he was an employee within the Bamboo Gardens restaurant and engaged in the performance of duties which his employment imposed upon him. It was his employment that placed him in a position and environment where he was assaulted and sustained the injury. At the precise time of the injury, he was engaged in the business of his employer. There was nothing to indicate that it was an attempt to injure Louie.

The intention of the assailant may have been limited to "shooting up the place", and that it was a random shot that struck claimant.

Louie vs. Bamboo Garden, et al, Supreme Ct. of Idaho, Sept. 16, 1947 Pacific Reporter, Second Series, Page 712

Heat Exposure

CLAIMANT was employed by the Magnolia Petroleum Company and while in the performance of his employment, dumping wax in the wax tank, some other employees turned on the steam for the purpose of treating the wax, with such force and volume that the steam filled the quarters where the claimant was and greatly heated up the room, filling up his nostrils, lungs and chest, overheating him and made him weak and dizzy, causing him to walk unsteady and his mind to be affected, become weak, upsetting his nervous system.

Claimant at the time was suffering from a disease known as syphilis and that the weakening of his body allowed and caused and produced an activation of his syphilitic condition and produced a condition known as "paresis".

Steam escaped from the heating tank in which the wax was being melted through the opening in the wall where the conveyor carried the wax from the press room to the tank, resulting on occasion in a mist or fog so dense that a person could not see the light bulbs over their heads, nor could the workmen see their partners working across a table from them some five or six feet distance.

On the occasion in question an unusual amount of steam was entering the room and according to witnesses, the worst they had ever seen. The men were working fast and in a rush to finish dumping the press they were then working on and no one would take time off to go outside and cut the steam off.

As a result of the existing conditions, claimant became very warm, started to sweat profusely and became weak, and after having worked some one and one-half hours, they completed dumping the press and his fellow workmen retired to a boileroom, where they could dry off and keep warm, while the claimant, because of feeling weak and dizzy, stopped outside of the building to

get the benefit of the fresh air, and that he became hoarse and caught cold.

The company resisted liability on the theory that the existing condition resulting in the claimant's injuries did not constitute an accident and, therefore, the claim was not compensable as an occupational claim.

Court rejected this theory and concluded that heat exertion constitutes personal injury within the contemplation of the Workmen's Compensation Act and further by reason of the medical testimony that a dormant syphilis condition could become active because of the shock or severe illness sustained by the result of overheating which was well established by the record and which resulted in dizziness, weakness, profuse sweating and nervousness to the claimant.

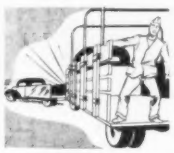
Recovery allowed.

Safety Gas Co. vs. Malvoux, Court of Civil Appeals of Texas, September 25, 1947

204 South Western Reporter, 2nd Series, Page 862

Because of Truck Accident

CLAIMANT seeks recovery as a result of injury sustained by reason of an assault and battery upon him by a third person, one known as "Willie". Saunders was employed as a truck driver and while in the performance of this duty, accidentally backed his truck into an Army truck. He alighted from his truck and undertook, as it was his duty, to obtain the license number of the driver of the Army truck.



The driver of the Army truck was cooperative, and no difficulty occurred until a large man on the Army truck, the man known as "Willie", whose status is unexplained and, as far as the record is concerned, was merely an intermeddler, undertook to ask the claimant why he was asking for the driver's license of the driver of the Army truck, when it was he who had backed into the Army truck. The claimant replied that "it was orders".

Up to this time, the claimant was in the discharge of his duties of his employment, and if the episode had culminated then and there in an assault by "Willie" upon the claimant, then the claimant's acts and words in the performance of his duties could have been said to have inspired the assault.

However, instead of stopping then and there, claimant obtained, or there was handed to him, a stick and he entered upon a contest with "Willie" in the exchange of abusive language, each trying to excel the other in the intensity of the sting of his insults and abuse. By no stretch of the imagination could the acts of the claimant in this connection have been intended by the claimant to inure to the benefit of his employer or to further the accomplishment of the employer's instant business, to-wit, the securing of the truck driver's license or permit number. The permit number seems never to have been secured. It appears that the purpose of securing it was finally abandoned, at the direction of a fellow employee of the truck, who told the claimant to get into the truck and "forget it". The claimant yielded to his suggestion and the assault upon him by "Willie" immediately followed.

This perhaps demonstrated claimant's victory or superiority in the tongue lashing art, as it was "Willie" who bolted the arena of verbal conflict and entered upon that of a

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.....ROLL-ALONG LADDERS	.....WATCHMEN'S CLOCKS	.....FIRE BUCKETS
.....FIRE HOSE	.....ACID PUMPS	.....ROCK UP RACKS
.....FIRE EXTINGUISHERS	.....RESPIRATORS AND PARTS	....."PLY"
		.....EYE SHIELDS

(Name) .....

(Company) ..... (Address) .....

physical violence, thus indicating his lack of satisfaction in his success in the former field.

There was no question that it was the act of the claimant in the gratification of his own spleen which motivated retaliation by "Willie" in the form of a physical assault. This arose out of the tongue lashing contest and not out of his employment. There is nothing to indicate that the claimant as a truck driver meeting with an accident was injured as a result of asking the opposite driver for his license. The claimant went beyond the purpose of the mission on which he was sent. The fact that these childish exchanges are unfortunately all too prevalent on our highways is not enough to constitute the employer an underwriter against the consequence.

The injury did not arise out of the course of his employment and claimant's petition for recovery was denied.

Sanders vs. Jarka Corporation, Court of Common Pleas, New Jersey, Essex County, October 26, 1947
55 Atlantic Reporter, Second Series, Page 301

Accident Occurs During Business Trip

BROWN and his wife together with one Mary and Walter Folley went to a yacht club, a branch of the St. Louis Boating Association, on the Missouri River. As they were returning to the Brown residence, the Brown's automobile collided with a telephone pole as a result of which Brown died.

Brown was employed as a salesman with the Weber Implement and Auto Co., and the automobile belonged to his employer. Recovery is claimed on the theory that death occurred by reason of the injuries sustained as a result of an accident out of and in the course of Brown's employment.

The company resists the claim on the theory that Brown has deviated from his employment and was on a purely personal pleasure trip and that the accident did not occur when and while he was reasonably fulfilling the duties of his employment nor when he was engaged in some activity incidental to his employment which had a casual connection with his injuries and death.

It is further contended that he was engaged in a purely social act and not known to and acknowledged by the employer and, therefore, the injuries did not arise in the course of his employment. Company resists the claim further on the theory that the record indicates that Brown violated two company rules which took him out of the company's employment in this connection, that he had no authority to solicit the yacht club and that Folley, a third person, in violation of a company rule, was driving the company automobile at the time of the accident.

Brown had been employed by the company for about twenty years, first as a parts man and later years as a salesman. He was paid his salary and commissions on sales and all the expenses while he was on the road. In addition, he paid all expenses of an automobile which the company furnished.

At the time of his death, Brown was an out of town salesman. His territory was Southern Illinois, north of route No. 50. The yacht club was off route No. 50 and the company contended that it was not in St. Louis City, but territory covered by its county salesman.

On Saturday, the 10th of February, 1945, Brown was around the office until in the afternoon and on that day he was given the automobile involved in the accident. The car he usually used was left in the company's service. The Browns and Folleys had made arrangements to bowl on the Saturday night in question. However, during the course of the afternoon, a call was received at the company from a Harry Precht, the secretary-treasurer of the yacht club requesting Brown come to see him that night for the purpose of pur-

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LASTING SATISFACTION, SAFETY and ECONOMY
Hillyard's famous trade-marked blue drum with white check bands have carried floor satisfaction for almost half a Century. Hillyards have maintenance products for every surface from the basement floor to the roof top. Hillyard's Floor Treatments, Seals, Finishes and Waxes properly protect and prolong the life and cut the maintenance cost of all types of floors. Hillyard Floor Machines are durable, economical, efficient. When Hillyard Products are used floors stay cleaner, look better, last longer.
There is a Hillyard Floor Maintainer in your locality ready to help you, his advice is FREE, call or wire us today, no obligation.
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HILLYARD SALES COMPANIES
470 Alabama St. San Francisco 10, Calif. DISTRIBUTORS HILLYARD CHEMICAL CO. ST. JOSEPH, MO. BRANCHES IN PRINCIPAL CITIES 1947 BROADWAY, NEW YORK 23, N. Y.

chasing some spark plugs and oil for the club. As a consequence Brown's plans for the evening were changed and instead of going bowling, the couples went to the yacht club in the company's car.

Brown drove and they arrived at the club at about 9:30 P. M. Precht immediately started to talk business with Brown and continued in this fashion until 11:30 P. M., when the couples remained at the club. The club closed at about 1:30 P. M. While the couples were on their way to the Brown residence, going about 25 to 30 miles an hour, the right rear wheel of the automobile came off and the car collided with the telephone pole.

There was no indication that either Brown or Folley was drunk. Brown had requested Folley to drive because he was tired and wanted to relax. The Court concluded that the defense theories were unwarranted.

The record reveals that the company recognized the order notwithstanding the fact that Brown had obtained an order from someone outside of his territory. There was nothing to show that Brown was restricted as to his hours. There was nothing as a matter of fact that definitely restricted him to an out of town territory. Some of his old customers still called Brown, who at one time was a county salesman.

The inference that the work of the employee created the necessity for the travel to the yacht club was justifiable. The accident occurred while on a direct route home. He died by reason of an accident arising out of and in the course of his employment, notwithstanding the fact that he stayed at the yacht club after he had obtained his order. He continued to dance and drink with his party. The record reveals that by reason of some defect in the wheel and not by reason of any act on the part of the driver of the car caused the accident.

The rear wheel came off, causing the car to collide with the telephone pole. The fact that Folley was driving the car did not of necessity prevent a recovery. Mere violation of an employer's rule in procuring an order outside of one's territory and permitting someone else to drive the employer's automobile was not such to preclude the death of the employee, who was subsequently injured in an automobile accident on the homeward trip. Mere violation of the company rule is not a defense to a claim for compensation.

Brown's employment did bring him on the trip and exposed him to its perils and it did arise out of and in the course of his employment.
Brown vs. Weber Implement and Auto Company, Supreme Ct. of Miss. Div. Nov. 10, 1947
206 South Western Reporter, Second Series, Page 350

Going and Coming Rule Applied

JASPER suffered injuries resulting in his death when an automobile traveling north on Fish Creek Road struck him as he was on his way to work and while walking across the third traffic lane of a four lane public highway at a point opposite and about 40 feet from the west entrance gate of the grounds at North American Aviation, Inc., near Grand Prairie. The Fish Creek Road was a connecting link between Dallas and Tarrant counties and was used generally by the residents in that area. The operator of the car which struck Jasper was not employed by North American, or by any of its subcontractors,

Why Morton's Salt Tablets to fight "heat fatigue"?

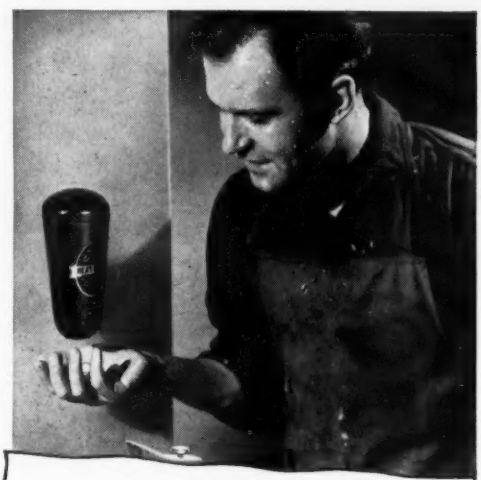
For years, industrial physicians and safety engineers have recommended salt tablets as low-cost insurance against the loss of efficiency and man-hours that "heat fatigue" causes. But it is vitally important that workers **accept** the salt tablets you provide them—are sure they are pure, reliable, safe.

Workers know Morton's Salt

Undoubtedly most of your employees use Morton's Table Salt in their homes. They know it is dependable and pure. So they accept Morton's Salt Tablets. They know they are a wholesome health aid backed by a familiar name.

Cost less than 1¢ a man per week

Morton's Heat Relief Salt Tablets—the best that money can buy—cost so little. Can you afford to be without "heat fatigue" protection in your plant? Order Morton's Salt Tablets and Dispensers from your distributor, or directly from this advertisement. Write for free folder. MORTON SALT COMPANY, 120 So. La Salle St., Chicago 3, Ill.



"Heat Fatigue" costs money!

Sweating robs the body of salt. This causes weariness—inability to work efficiently—and eventually, heat-cramps and prostration. "Heat fatigue" cuts down productivity, steps up absenteeism.

Morton's Salt Tablets act **fast** to replace lost body-salt—help keep production and efficiency at high levels. They're pleasant, easy to take, inexpensive.

Modern Plastic Dispenser. Practical, accurate, large size. 1000 tablet capacity.....$3.25

Heavy Duty Dispenser. Strong metal for rough treatment. Accurate. 500 tablet capacity.....$4.00

Morton's Salt Tablets Case of 6000, 10-grain, plain salt tablets....$2.10
Case of 6000 8-grain Salt Dextrose Tablets. $2.60

and he was using the highway at the time as a member of the traveling public.

Jasper was employed by James Stewart & Company, as its storekeeper at its storehouse located on the plant site of the North American Aviation Company plant. James Stewart & Company was an independent contractor and at the time was engaged in doing certain work for the North American Aviation Company. The entire plant site was enclosed by an insurmountable metal fence with entrance gates presided over by uniformed guards in the employ of North American.

Stewart's warehouse, where Jasper worked, was located on the plant site within the fenced enelosure some 528 feet from the west gate, off Fish Creek Road, and was reached over a private roadway within the plant enclosure.

The employees of Stewart were required to be on the job at 8 A. M. Jasper usually arrived early in order to check out the tools to the several hundred employees at Stewart. On the west side of Fish Creek Road, directly opposite and facing the entrance gate, was a privately owned and operated cafe. Adjoining the cafe was about 100 square feet of open ground where a number of the Stewart employees parked their cars and got an early morning cup of coffee before riding across Fish Creek Road, through the entrance gate and into the parking area on the grounds provided by Stewart for his employees.

On the morning of the accident, Jasper left home about 6:30 in a car, in company with two other men, one, Mr. Wall, being the owner of the automobile. Wall stopped his car in the vacant space adjoining the cafe, intending to drink coffee and then drive the car across the public highway, through the entrance gate into the parking area within the enclosure which was fenced. All three started into the cafe, but Jasper decided he didn't have time to stay for coffee, left the cafe and started walking across the highway approaching the west entrance gate to the plant site. When he arrived at a point in the third traffic lane,

(Continued to Page 35)

—Alarm Boxes—

Oftentimes control of a fire depends on the speed that professional firemen can be summond from the outside. All approaches to fire alarm boxes should be kept clear at all times. Avoid piling crates and other material around the fire alarm box. Employees should be inform-

ed about these locations and should be familiar with the type extinguisher posted at each station. Each extinguisher should be identified by the sign and every employee should know what type of extinguisher to use in event of fire. (Photo: Leeds & Northrup)

FLOOR BEAUTY...
EASY MAINTENANCE...
PLUS
SLIP RESISTANCE

SAFETY

For All Types of FLOORS with

VESTA-GLOSS

The ONE Floor Wax that provides ALL SIX of these floor maintenance essentials (1) Slip Resistance (2) Wear Resistance (3) Water Resistance (4) Lustre (5) Self Leveling (6) Non Tacky.

Approved by Underwriters' Laboratories

VESTA-GLOSS is the ideal floor finish where both floor safety and floor beauty are important considerations . . . and where heavy foot traffic necessitates a long-wearing, easily and economically maintained floor.

VESTA-GLOSS is a scientifically balanced waterproof treatment for all types of floors. It dries (without polishing) to a tough, long-lasting, lustrous yet slip-resistant finish that is NOT TACKY and will not flake, crack or powder off. VESTA-GLOSSed floors are easily kept clean by simply sweeping with a soft brush or Vestal Buffing Mop. Write us for free demonstration.

BRITEN-ALL

A highly concentrated liquid cleaning compound for floors and woodwork. Briten-All is a neutral cleaner that cleans better, safer, easier—at lower cost.

VESTAL ELECTRIC FLOOR MACHINE

Scrubs and polishes faster. Easy to operate. Safe. Exceptionally quiet. Sturdy, perfectly balanced construction.

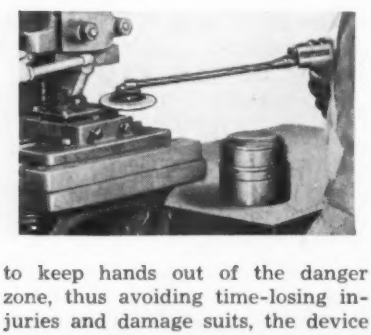
VESTAL INC. ST. LOUIS • NEW YORK

New PRODUCTS

NP-1 . . . LIFTING HOOK—Elizabeth Iron Works have announced the manufacture of their patented device Diamond Torque Hook to facilitate the handling of steel sections. The unit is applied to the section to be

moved with grips placed on flanges. Torque action is developed as soon as lifting power is engaged and the section is suspended at once. The smaller unit has a weight capacity of 7,000 lbs, while the larger unit has a capacity of 10,000 lbs. Both hooks were tested by U. S. Testing Co. Manufacturer claims operation of the Diamond Torque Hook is easy, fast and safe. The grip increases in direct proportion to the weight of the section that is being handled.

NP-2 . . . SAFETY DEVICE—Among the many safeguards devised to prevent injury to hands is the Littell Press-Vac Vacuum Picker. Designed



to keep hands out of the danger zone, thus avoiding time-losing injuries and damage suits, the device is operated by compressed air of 20-45 lbs. The vacuum cup is placed on a flat piece of material, the trigger is pulled, causing the cup to pick up the material, which is fed into the press. Operator releases the material by releasing the trigger and so keeps his hands clear of the danger zone at all times. Press-Vac is made with one or two cups, as desired.

NP-3 . . . GERMICIDE — A newcomer to the field of personal protective items is an especially powerful germicide announced by Willson Products, Inc. The Willson Germi-

cide is offered to industry for sterilizing personal safety equipment. Manufacturer claims the germicide is non-corrosive, non-staining and practically odorless. Approximately 25 times more powerful than carbolic acid, the germicide is non-poisonous and non-irritating to the skin. The solution may be used as a spray, swabbing solution or an immersing solution for gas masks, goggles, welders' lenses, respirators or any washable apparel.

NP-4 . . . PERSPIRATION RETAINER —The M.S.A. Cool Band is an efficient perspiration retainer designed by Mine Safety Appliances Co. to provide greater comfort for men working on hot jobs. The soft, sponge rubber unit comfortably circles the head and absorbs perspiration, creating a cooling effect. Light in weight, the Cool Band clings to the head without binding. The manufacturer

states that by preventing perspiration from dropping into the eyes and on glasses or goggles the product promotes better working comfort and efficiency.

NP-5 . . . WELDING HELMET — A new, lightweight, low-cost welding helmet with all the protective advantages of more expensive models has just been announced by Willson Products, Inc. Protective features include Willson-Weld Lens. Available in 12 different shades.

Clear cover glass protects the

welding glass from pitting. Helmet is constructed of a single piece of tough, dense, vulcanized fabric. When in place for welding, the helmet extends below and under the chin as well as over the ears and protects against flying sparks and hot metal. Entire unit weighs only 19 ounces. Headgear is adjustable.

NP-6 . . . SAFETY GOGGLE—Chicago Eye Shield Co. have recently announced to industry the development of their new CESCO Spec-Lite goggle. A new type forehead rest, plus balanced double suspension is said by the manufacturer to practically float the Spec-Lite in position. The weight of the goggle is only 1 oz., yet it affords exceptional coverage up and down and laterally protects the entire eye area from sparks, light impacts, liquid splashes and other hazards.

The new design also permits comfortable wear over personal glasses. The new Spec-Lite also features quick adjustability and correct fit on various faces.

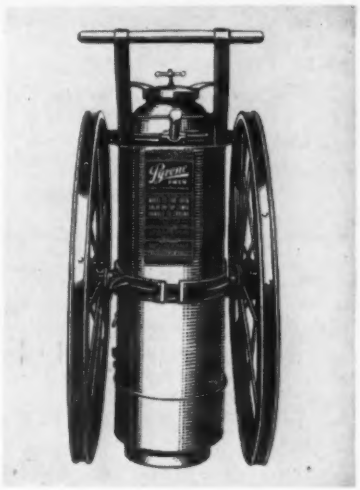
NP-7 . . . FLOOR CLEANING MACHINE—A low center of gravity and special reversing switch designed to prolong brush life are features of the new CORBIN floor cleaning machine just announced by Corbin Screw Division of American Hardware Corp. Available in single or twin brush models, the machines are of the revolving brush type designed for wet and dry scrubbing, waxing.

rug shampooing, floor polishing, grinding, sanding and troweling. Single brush models feature a special reversing switch permitting choice of clockwise or counter-clockwise rotation. Tests indicate that this feature prevents bending, matting and burning of bristles, keeps wire brushes sharpened and increases cleaning efficiency.

NP-8 . . . POLE-CLIMBERS—Adjustable pole climbers, with an extension shank or leg iron that can be set any desired length between 15 to 18½ inches—assuring an exact fit for any leg—has been introduced by Buckingham Manufacturing Co., Inc. This new adjustable climber has all the safety features that characterize Buckingham conventional climbers. The adjusting feature is simple and fool-proof. The shank can be bent if desired to conform to leg contour.

NP-9 . . . PERMANENT INSECT CONTROL—The West Disinfecting Company have announced a new method of permanent insect control through use of their new West Atomizer claimed to be a most efficient step for efficient, practical and economical use of insecticides. The atomizer, operated by air-pressure, steam presssure, or carbon dioxide gas pressure, disseminates a "dry" mist of dense insecticidal fog which will penetrate cracks and crevices where insects hide and breed. Because of the "dry" mist, no condensation is noticed on tables, walls or any equipment. To meet the needs of every type of industry, West's staff of entomologists have perfected six different types of atomizers to provide permanent insect control.

NP-10 . . . NEW EXTINGUISHER—A new, wheeled, foam engine, designed to produce better fire-fighting foam and more of it faster, has been put



on the market by the Pyrene Manufacturing Company. The extinguisher, of 40-gallon capacity, is an improved weapon against flammable-liquid fires in industry. The new engine will deliver from 375 to 400 gallons of foam in three and a half minutes. George H. Boucher, Pyrene vice president, states the foam is stiffer, lasts longer and performs more efficiently against flames. Foam stream has a range of 40 to 55 feet.

NP-11 . . . NEW TYPE LITTER—The Emergency Aids Company announce that through the use of light weight

aircraft (chrome-moly) steel tubing, the total weight of the COLLAPSI-COT, a new type multi-purpose litter, has been reduced to only 23 pounds. With this new reduced weight, the unit can be easily carried, manipulated and stored by one person, and transporting patients is much easier. Molded rubber wheels at both ends permit COLLAPSI-COT to be used (by one or two attendants) as a litter, stretcher transfer chair, or treatment cot. For storage and transport it collapses to 48 x 20 inches, and for use it extends to 75".

NP-12 . . . HEAT FATIGUE DROPS—A new product for the prevention of heat cramps and heat exhaustion—BENSON HEAT FATIGUE DROPS—has just been announced by the manufacturer.

This new product is said to differ from other heat cramp preventives in two significant respects. First, they not only contain common salt but also two other body salts lost during perspiration and dextrose to provide a quick energy restorer. Second, the drops are made in special butterscotch candy form which is refreshing and pleasing to the taste. Samples of BENSON HEAT FATIGUE DROPS are available on request to interested executives.

NP-13 . . . POWER PRESS SAFETY DEVICE—The MICROTRIP, a safety device for actuating all types of power presses, has been developed by Micro Switch. The device is said by the manufacturer to protect the machine operator, to reduce operator fatigue and to speed production. It is an operator protecting device for use on punch presses, riveters, spot welders, air presses and similar power operated machines. The MICROTRIP unit includes the control box and two operating switches, and the necessary solenoid equipment to trip the clutch pin or operated valves.

NP-14 . . . REINFORCED ASBESTOS GAUNTLET—An improved leather reinforced Asbestos Gauntlet has been designed by Industrial Gloves Company. Reference to the accompanying photograph shows that the usual seam on the palm, or working surface, where thumb and palm are joined, has been eliminated. The manufacturer points out that now there is no seam to rip or burn out

at the very important part of the glove. A more rugged glove is thus provided giving longer, better and more economical protection.

For more information on these New Products, just fill out the postcard bound in this magazine and send it to us.

THIS THIN TOOL STEEL CORE

is welded between supporting walls of softer metal which wear down first, leaving the hardened core sticking out—always sharp because it is thin.

Any other spike, if made with only one kind of metal, will wear as dull as the full thickness of the spike.

Dull spikes are a hazard. Constant inspection and sharpening is expensive and does not fully eliminate the danger. SAFE-HI stops both expense and the hazard.

SAFE-HI gives you many other exclusive features.

Other Safe-Hi Products

Ask your safety dealer or write us for descriptive literature.

Pole Grips and Wall Grips to hold the top of your ladder

Safety Belts and Shock Absorbers for Safety Belts

Safe-Hi PRODUCTS

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1731 Arapahoe St. Denver 2, Colo.

INDUSTRIAL
Accidents in the News . . .

These accidents are taken from the pages of the Nations Newspapers. They've all happened—they didn't have to!

Owosso, Mich., Argus-Press:

Glen Williamson, an employee of the Midland Metal Works of this city, sustained the loss of half of his right hand when it became caught in some machinery at the plant. He was treated at the Durand Hospital and later returned to his home.

◆

Jamaica, N.Y., Long Island Press:

John Donofiro, 65, of Maspeth, lost all his right fingers yesterday afternoon when he caught his hand in a power press in a factory at 15 Crosby street, Manhattan. He is at Bellevue Hospital.

◆

Fort Wayne, Ind., Jour. Gazette:

Harold E. Miller, 24, of Andrews, suffered a mangled left hand at 8:30 p.m. yesterday when it was caught in the machinery of a punch press at the Wayne Pump Company. Miller was given first aid and then taken to St. Joseph's Hospital for surgical treatment.

◆

Homestead, Pa., Messenger:

Joseph Yeager, Valeview Drive, is confined in the Homestead Hospital with a badly crushed hand. Yeager is employed by the Whitaker Metal Products Co., Whitaker, as a machinist. While operating his machine his hand was caught in the gears. It is feared that the amputation of two fingers may be necessary. He will be confined in the hospital for considerable time.

Pittsburgh, Pa., Press:

Surgeons at St. Joseph's Infirmary today amputated the right hand of Joe West, 19, after it was crushed yesterday in a huge pressing machine at the Sterling packing and Gasket Co.

PREVENTION

This month all news clippings on this page concern amputation injuries because of the important article on cost to the employer of such injuries currently appearing in this issue of the magazine. Perhaps all or most of the injuries described in these clippings could have been prevented or at least minimized if all the machinery involved in these accidents had been fully guarded with suitable safety devices.

GUARDING DEVICES

Elizabeth, N.J., Journal:

Zenon Nafalski, 31 years old, of Wallington, lost his right thumb when it was caught in a machine while he was working at the Elizabelt Bolt & Nut Corporation plant, shortly after 6 o'clock last night. He was treated at Elizabeth General Hospital by Dr. Herbert Johnson.

Houston, Texas, Post:

Michell Delesline of Kemah, was seriously injured when a power saw ripped into his leg. He was taken to Danforth Memorial hospital. He told doctors his trousers became snagged in the teeth of the saw. When he attempted to free himself, he accidentally snapped on the switch and the saw ripped into his leg.

◆

Jamestown, N.Y., Post Journal:

Louis Nugent, 29, of Warren, Pa., suffered the amputation of three fingers of his right hand at W.C.A. Hospital after his hand became caught in a press at the Dahlstrom Metallic Door plant where he is employed.

◆

Saugerties, N.Y., Post:

Fred Wach, Elizabeth St., had the tip of the fingers of his right hand clipped off on Wednesday, while he was at work operating a machine in the Martin Cantine Co. mill. The injured fingers were dressed by Dr. Lester A. Sonking.

◆

Watertown, N.Y., Times:

Miss Geraldine Moser, 18, employee of the F. N. Burt Company, Inc., paper box manufacturers, suffered the loss of one finger and lacerations to another when she caught her right hand in a press while at work at the factory. Miss Moser was admitted to the House of the Good Samaritan. The middle finger of the hand, nearly severed, was amputated to the first joint. The index finger was lacerated.

SAFE HANDLING OF GASOLINE
from page 17

the demonstration shows that gasoline vapors present a constant source of danger wherever there is a leakage of gasoline, and the escaping liquid vaporizes. This characteristic of gasoline vapors likewise creates the hazard of explosion and fire within an enclosed container or tank, or in a pit. Further, the settling of vapors at a low level results in a deficiency of oxygen, endangering any workman who might enter an empty tank without wearing a proper protective mask. It is also explained how gasoline vapors tend to displace the normal amount of oxygen (approximately 16% of total air) required to support life.

In addition to the explosive and fire hazards of gasoline, its toxic hazards are also outlined. It is explained that gasoline vapors in excess of one-tenth of 1% by volume—or one part of vapors to 1,000 parts of air—render that atmosphere unsafe to breathe. Besides that of gasoline, the toxicity of blending agents and gasoline additives also is reviewed. In discussing the toxicity of tetraethyl lead, active ingredient of Ethyl anti-knock compound, it is noted that the minute volume of 400 micrograms of lead vapor in 100 cubic feet of air is considered to be the maximum safe breathing limit.

Because concentrated tetraethyl lead is poisonous, Ethyl Corporation has developed comprehensive safety procedures governing the additive's manufacture, shipment, and blending with gasoline. The whole system of handling and mixing Ethyl brand of antiknock compound is so designed that no individual shall come in contact with the fluid. The refinery blending system essentially is closed, and the actual antiknock fluid is transferred from shipping containers to gasoline under a vacuum.

The final portion of the Ethyl show treats with the various methods used for cleaning gasoline storage tanks, especially the removal of toxic vapors.

A plastic tank, constructed to scale, is used for demonstration purposes, and a chemical smoke is employed in place of actual gasoline vapors, which could not be seen due to their lack of color. Also used is a miniature air mover, operated on the same principle as a full-scale commercial unit. Through the use of these pieces of equipment, it is possible to observe closely the behavior of gasoline vapors during the process of vapor-freeing a tank. They also

Tank ventilation methods are vividly illustrated through use of a tank and air mover models.

permit illustration of the relative efficiency of various methods of gas-freeing storage tanks.

In the actual cleaning of a leaded gasoline storage tank, it is pointed out, there is the possibility of hazard from the liquid gasoline; of the fire, explosion, asphyxiation and poison hazards from gasoline vapors; and finally the possible hazard from tetraethyl lead as a liquid, vapor or

This meter and heating element are used to demonstrate gasoline vapor's ignition temperature.

dust. How some of these hazards are overcome is portrayed in demonstrations with the plastic model tank, the miniature air mover, and the chemical smoke.

A brief discussion of the activities of the Ethyl safety department on behalf of customer companies rounds out the hour-long presentation. One of these activities, as many refinery and bulk plant personnel know, is to make available the services of safety engineers whenever a storage tank that has contained leaded gasoline has to be entered for cleaning or repairing. These men act in an advisory capacity from the lead standpoint, and attend as many as 300 tank cleanings a month.

Mention is also made of the new developments in tank cleaning procedures, particularly in the field of tank design as an aid to this operation. Advantages to be gained from further research in tank cleaning methods, especially pertaining to tank ventilation, also are discussed. Naturally, improved safety and lower operating costs are the goals in this line of endeavor.

The Ethyl show now on tour of refineries is being presented in the hope that, through its informal discussions and its simplified demonstrations, the presentation may contribute to a wider understanding of the usefulness of gasoline and of the reasons why proper safety procedures are necessary.

Huntington Announces New Film Available For Free Showing

A NEW 16 mm. sound motion picture, "Scientific Floor Maintenance", has just been announced by Huntington Laboratories, Inc. It will be shown to the staff of any school, hospital, industry or institution on request. It illustrates the latest and most economical methods of floor maintenance and it is shown without cost or obligation. Many cleaning problems presented by modern floor materials are answered . . . maintenance men quickly learn the best ways to protect and preserve expensive floors and floor coverings.

This film is the result of 27 years study and experience with varied conditions and problems over the entire country . . . and demonstrates safe methods of cleaning, protecting and beautifying flooring material. It is filmed in a way men will understand readily. It fills a long need for an authoritative training aid. A free showing may be arranged by writing to Huntington Laboratories, Inc. Huntington, Indiana, or by contacting your Huntington Salesman.

from

INCREASE PRODUCTION THROUGH SAFETY PROGRAMS

M. J. McCARTHY
Safety Director, Fisher Body Division
General Motors Corp., Detroit

The usual results of industrial accidents are broken machines and damaged material. Such accidents slow down plant production. Repairs to machinery, replacement of material and compensation to injured employees are only part of the cost to management which comes of accidents. Management should insist on a strong safety program which will cut down on occurrence of costly accidents on their properties. Here are six principles to insure such a program. They must be enforced by top management.

1. Interest in Safety by Top Management.
2. A Definitely Established Safety Organization.
3. Capable Full-time Safety Personnel.
4. Written Safety Procedures and Instructions for each plant occupation.
5. Thorough Safety Instruction of New Employees.
6. General Stimulation of Safety.

Principle No. 1

The general manager should meet at least once a month with certain members of his top supervisory staff to review the safety record. This group includes the following:

Factory Manager, Superintendent, Plant Engineer, Personnel Director, Plant Physician, Safety Director.

The functions of this group are:

(1) To review safety performance of the plant.
(2) Discussion of major safety problems and decision for correction.
(3) Formulation of safety policies for guarding equipment, education, etc.

Principle No. 2

Management should hold superintendents responsible for holding meetings with his foremen once a month. Each meeting should consist of a review of safety policies and the application of these policies to specific cases. The superintendents should hold foremen responsible for the following:

(1) To know fully the general safety policies of his division.
(2) To consider safety a major responsibility.
(3) Write all orders for safety guards for their departments.
(4) To follow up such orders.
(5) To discuss safety with two or more of his employees every day, for at least five minutes.
(6) To instruct new operators on safe operation of equipment, and old operators on safe operation of new equipment.

Principle No. 3

Management should put a qualified man or men in charge of setting up an efficient safety department. The general duties of such a department are:

(1) Promotion of safety by repeated contacts with foremen and stimulation of interest in safety education, safeguarding against accidents and the constant promotion of good housekeeping.
(2) Maintain contact with plant physician so that hazardous spots in the plant may be studied with a view toward eliminating the hazard involved.
(3) Supervising a general safety educational program for new and old employees.
(4) Daily plant inspection.
(5) Make suggestions concerning types of safety equipment for the job, such as aprons, shoes, goggles, helmets, masks, etc. These are the suggestions that top management should see are carried out.

Principle No. 4

Management should insist that safety instructions are written up for every occupation in the plant. If the plant is very large, the job can be accomplished by putting foremen to work compiling safety rules for his department. This job should be done under the supervision of the safety director.

Principle No. 5

It is the new employee who is most liable to meet with accident. Management should direct that, as part of the company policy, each new employee be thoroughly instructed in safe practices before he is permitted to work. The safety director should explain the safety rules of the plant. He should give the employee a copy of the written instructions for the particular job to which the employee has been assigned. A daily follow up should be made with the employee to make sure that he is observing the safety procedures.

Principle No. 6

Management should create a general interest in plant safety by encouraging the worker to submit safety suggestions for which they are given prizes.

The plant house organ is one way management can directly express its interest and concern over the safety program existing in the plant. Safety posters, campaigns, contests and other devices are all methods by which management can reduce accidents in the plant and so increase production through reducing costly accidents.

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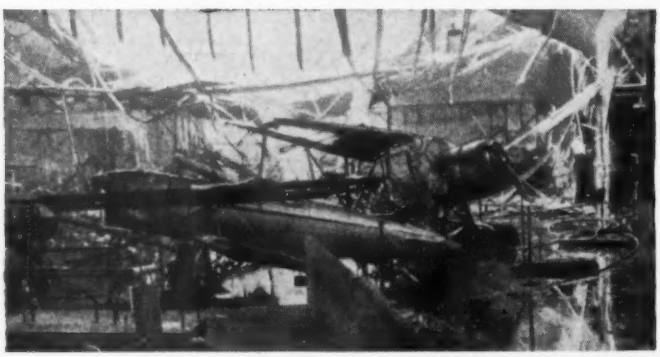

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Where industrial processes involve explosion gases, liquids and dust conditions, Masterplate floors have become mandatory because they are sparkproof and static disseminating.

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SALES FORCE FOR SAFETY
from page 20

meets with the safety director once every two weeks and is given instructions on safety functions. Safety training films are also used at these meetings. After completing three months service on the safety committee the men become qualified members of the safety sales force—a force which is getting excellent results. After one year we have seventy-five efficient safety salesmen.

The foremen's safety committee is comprised of the head supervisor from each department. It is the responsibility of management and the safety director to sell safety to each member of the group of "safetysales managers" in a continuous safety promotion program.

With our sales-force trainees learning and practicing the "know how" of safety, they are constantly on the alert. Practical suggestions for removing hazards and obstacles are presented at each meeting and a constant improvement in our safety facilities is the result of these suggestions.

In our sales campaign for safety we do not neglect the advertising angle. Even the best product must be well advertised and in this respect we do everything possible to warrant prestige for our product. Our bulletin boards are kept clean and fresh. Timely safety posters are changed at regular intervals. We have large stationary signs placed strategically at vantage points throughout the plant. It is impossible to walk through our plant without constantly being confronted with safety reminders.

High on the list for credit as a contributing factor to our safety record is good housekeeping. A must for any safety program, good housekeeping was given particular emphasis in the program of sales training for safety.

With a splendid improvement in housekeeping and a spotless safety record going well into its second year, we at Columbia believe that our sales force for safety has proved itself to be a very valuable addition to our organization.

Look on page 47 for valuable reading material available to you. Fill in the enclosed postcard and mail to us.

TECHNICAL FILE ON METAL POISONING

SAVE THIS VALUABLE REFERENCE MATERIAL: BUILD UP A PERMANENT OFFICE FILE.

C205. CONTROL MEASURES. The control measures for the barium hazard follow the adequate exhaust ventilation and the good housekeeping procedures specified for lead and other metals. Here also it is important to point out that among the aids for the protection of the worker should be included protective skin ointments, gloves, and other dermatitis control measures.

C206. THALLIUM POISONING. Thallium is a silvery-white metal melting at 300 degrees Centigrade and found as a sulphide in combination with such ores as zinc, lead, bismuth or platinum. As an acetate it is four times as toxic as arsenic. The carbonate is used to color glass, to make artificial gems and in fireworks. Other uses of thallium or its compounds are in dyes and pigments, tungsten lamp filaments, thermometers and scientific apparatus.

C207. CHIEF EXPOSURES. The chief industrial exposure comes from inhaling and absorbing the dust, the metal tending to accumulate in the body to cause a chronic poisoning. The main toxic effect is upon the sympathetic nervous system and the endocrine glands. Prevention and control follow the programs outlined for the other toxic metal dusts, such as lead.

C208. COPPER. The incidence of copper as an industrial poison is reported to be negligible. Copper vaporizes only at a temperature of at least 2350 degrees Centigrade. This figure is so much higher than that of other constituents of metal alloys that the cases of exposure to metal fume fever from copper are very few. Some reports of bronze diabetes characterized by a skin pigmentation and supposedly due to the chronic copper poisoning have been recorded. However, sustained proof of such a disease is lacking to date. Ill-health found among miners of copper ores may be associated with exposure to ore impurities, such as lead and arsenic. However, workers sometimes show a green copper line on the gums, and sometimes even the perspiration is green-tinted. As with other metal dusts, complaints of skin irritation, dryness of throat, headache, chills and nausea have occasionally been reported among workers exposed to copper compounds. Treatment and prevention follow the established controls laid out for other metal dusts. utmost importance. Nnckel carbonyl is reported dangerous if the work room air tend to recur to an increasing degree within tweleve to thirty-six hours. The new

C 209. SELENIUM POISONING. Selenium is a steel-grey or dark red crystalline metal with a radish-like odor, and is found in association with copper ores. Its specific gravity is 4.3, melting point 217 degrees Centigrade, and boiling point 690 degrees. It is insoluble in water, and soluble in sulphuric acid. Chemically, it forms the same compounds as sulphur. When mineral acids act on selenides, a toxic gas (hydrogen selenide) is formed, and workers in such exposures must be protected from its effects.

C 210. USES OF SELENIUM. An outstanding property of selenium is that its electrical conductivity is increased in the presence of light and decreased in its absence. This has made possible the development of the photo-electric cell. Other uses of the metal with their accompanying resultant poisonings are increasing rapidly. Selenium is now used in glass manufacturing, ceramics, vulcanizing and curing of rubber, plastic manufacturing, steel and brass alloying, pigment manufacture for paints and inks, and as an oxidizing and chlorinating agent.

C 211. SYMPTOMS. Most of the soluble selenium compounds are toxic and can produce both acute and chronic poisoning, depending upon the type of exposure. Inhalation, ingestion and skin absorption of the dust are all causes of poisoning. The acute form leads to convulsions and death. The chronic form presents digestive disturbances, garlic-like breath and perspiration, metallic taste, pallor, nose and throat irritation and nervousness. Diagnosis of selenium poisoning should include urine tests as the presence of the metal can be determined there. The treatment of acute intoxication follows the usual routine of removal from exposure, hospitalization and administration of drugs for the elimination of the poison. The chronic form is treated according to symptoms upon removal from the hazard.

C 212. CONTROL MEASURES. The recommended engineering controls, plant housekeeping techniques, and worker protection programs for lead and other metal poisons apply here. No safe concentration figures have as yet been officially established. Pre-employment examination should exclude from exposures workers who are found in poor health, or with histories of such chronic diseases as arthritis and liver trouble. Regular subsequent physical examinations of selenium workers should weed out the unfit.

C 212A. TELLURIUM. Tellurium is a metal found as an impurity of certain copper and lead ores and is similar to selenium in its chemistry. That is, it forms chemical compounds in the same manner as the element, sulphur. It also imitates selenium in its effect on exposed workers.

C 213. EXPOSURE. The most familiar use of industrial tellurium is as a coloring agent for glass, but exposures are present wherever the impure copper or lead ores are refined. During such processes, tellurium gives off a poisonous gas (hydrogen telluride) and enclosure precautions must be taken. The dust from the ores may contain particles of tellurim oxide, which is similarly poisonous.

C 214. SYMPTOMS. Tellurium poisoning is usually chronic in form and causes

TECHNICAL FILE ON METAL POISONING

discomforts identical with selenium, but is seldom disabling. Again, the most characteristic symptoms of the poisoning are the garlic-like odor of the breath and perspiration, the metallic taste and the digestive disturbances. However, tellurium tends to dry out secretions, a property that lowers perspiration and causes dryness of the mouth and throat. As in selenium poisoning, the worker should be removed from exposure and put under the doctor's care. The same control and preventive measures should be followed.

C 215. INDUSTRIAL VANADIUM. Vanadium is a metal whose use has increased greatly within the last few years, but it is only the vanadium pentoxide dust which has been pronounced to date as being injurious. The specific gravity of the metal is 5.87, and the melting point 1715 degrees Centigrade. The pentoxide dust is slightly soluble in water, soluble in acids and alkalis and, therefore, an expectable hazard when inhaled or ingested.

C 216. EXPOSURES. The metal is used in the manufacture of vanadium steel and in other metallurgy, in making of black inks, ceramics, inoculations for plants, textile dyeing and printing, glass making and generally in the dye and chemical industries. The toxic effects of the dust or the acid fumes noticed so far have been confined to the eyes, the upper respiratory tract and the lungs. In a diagnosis, tests are made of the urine and the saliva.

C 217. SYMPTOMS. Symptoms of the poisoning usually are a cough, often severe enough to cause a hemorrhaging, a burning of the eyes, nose and throat, digestive disturbances, a pallor due to secondary anemia, and the presence of blood in the urine. Prolonged exposure causes vertigo, visual disturbances, tremors, depression and hysteria. Chronic bronchitis is a frequent occurrence among vanadium workers.

C 128. TREATMENT. Treatment must follow the usual pattern of removal from the exposure and the attendance of an experienced doctor. Specific care is needed for each of the symptoms displayed, such as affections of the eyes, nose or bronchi. Prevention and control measures are similar in essence to those outlined for lead.

C 129. RADIUM. Radium and similar radioactive substances, such as mesothorium, apart from their status as eye and skin hazards caused by their radiant energy, can be inhaled or ingested in the form of dust. Workers who mine and reduce ores and salts, refine, process and distribute the materials, as well as those who use them, may also be exposed to these hazards.

C 130. INDUSTRIAL EXPOSURES. Familiar radium products are radioactive water and a luminous paint used in painting dials on watches and aircraft instruments. The hazard to dial painters has been reduced greatly since "pointing" of paint brushes no longer is done by using the lips, and since mechanical devices isolate the paint-mixing operations. No major outbreaks of radium poisoning have been reported since those occurring in Northern New Jersey several years

C 131. SYMPTOMS. The earliest symptoms of radium poisoning may not be apparent for several years after the first exposure. An absorption of 120 to 180 micrograms of radium constitutes poisoning exposure and shows effects within one to five years. Chemical or physical tests on suspected victims will permit estimation of the amount of radium emanation coming from the bones. This result makes a definite diagnosis possible. The action of ingested radioactive substances within the body is cumulative and progressive. About 95 percent of the material taken into the body is stored in the bones. From that deposit the characteristic emanations of radium decay are given off continuously. The principle effects are changes and destruction of both red and white blood cells, the result of which is anemia, and severe bone affection.

C 132. PERIODIC EXAMINATIONS. The poison acts so slowly and insidiously that the victim may be in good health for years after the first exposure. Workers affected by mild exposures may recover with only anemia as a permanent aftereffect. That is why periodic examinations are tremendously important in saving manpower from this hazard. Complete controls have been worked out in a United States Commerce Department pamphlet, entitled, Radium Protection.

C 133. BERYLLIUM. Beryllium, also called glucinium, is a comparatively expensive metal whose most important use at the present time is as an alloy with copper in the manufacture of precision instruments. Springs made of this alloy resist fatigue and corrosion under conditions which prohibit the use of steel springs. Other usese include alloynig with aluminum, magnesium and nickel, making filter glass for X-ray tubes and textile fiber from seaweed. The principal source of the metal is an ore called Beryl, but because the mineral is relatively inert toward acids and alkalis, high temperatures and fusion methods are required in the extraction processes. Certain beryllium salts, like the chloride and the fluoride, have a peculiarly sweet taste.

C 134. "BERYLLIUM RICKETS." Beryllium poisoning has been variously referred to as causing "berylliosis" and "beryllium rickets." The former, a type of pneumoconiosis, is essentially lung damage due to inhaling excessive concentrations of dust or fumes, and is similar to the result of lung exposure to phosgene or chlorine gas. The rickets result from body absorption of excessive quantities of the dust when inhaled or swallowed over a period of time. However, recent studies made in beryllium exposures indicate that the metal itself has no particular toxicity and becomes hazardous only because of the manner in which it forms compounds. It is the acid radical such as the fluoride or oxy-fluorid, and the hydrolytic action of the chloride and the sulphate which exert the irritating action on the body tissues. This is also held true of the severe dermatitis frequent among poorly protected beryllium workers.

C 135. CONTROL. The treatment of poisoning and control measures for its removal must follow the procedure outlined for the fluorine and chlorine compounds. Beryllium, itself, has no inherent toxicity. Safe, permissible working standards must therefore be based not on beryllium, but on its individual salts.

OFF THE DOCKET
from page 25

which was approximately forty feet from the entrance gate, Jasper was struck by the left fender of a north bound speeding automobile. He was hurled through the air some thirty-five to forty-five feet and his body came to rest about four feet inside of the outside concrete slab, death being instantaneous.

It was contended that all of Jasper's services were performed in the storehouse within the plant's enclosure. He had no duties away from the storehouse itself. The question arises in this case is whether the facts as above stated come within the explanation of the well established "going and coming rule" as applied to Workmen's Compensation Law. It states that as a general rule, an employee cannot recover under the compensation law for injuries sustained while going to or coming from his place of employment. The fact that he must use the streets for coming to and returning from work does not make the risks there encountered incident to his employment.

Was Jasper at the time of the accident engaged in performing duties in the course of his employment? It was the consensus of opinion of the Court that at the time Jasper was killed, he was not performing services of his employer, nor did Jasper's employer have any control over the public highway where he was killed, nor did his injury arise in or about the furtherance of the affairs or business of his employer. Jasper was acting solely on his own in returning back to work, and he met his death on a public highway where he was subject to all of the hazards of the traveling public.

In order for there to be a recovery, an injury must both arise out of and also be received in the course of employment. Neither alone is enough. It is sufficient to say that an injury is received "in the course of" the employment when it comes while the workman is doing the duty which he is employed to perform. It arises "out of" the employment when there is apparent to the rational mind that there is a casual connection between the conditions under which the work is required to be performed and the resulting injury.

It excludes an injury which cannot fairly be traced to the employment as a contributing cause and which comes from a hazard to which the workman would have been equally exposed apart from the employment. The causative danger must be peculiar to the work, and not common to the neighborhood. It must be incidental to the character of the business and not independent of the relation of master and servant. It need not have been foreseen or expected, but after the event it must appear to have had its origin in a risk connected with the employment, and to have flowed from that source as a rational consequence.

No recovery.

Jasper vs. Texas Employers Insurance Assn., Ct. of Civil Appeals of Texas, Nov. 24, 1947
206 South Western Reporter, Second Series, Page 646

NEXT MONTH!
COST OF INFECTIONS
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Dust and fumes don't get a chance to circulate in plants equipped with a Schmieg CENTRI-MERGE Eliminator. The moment dust or fumes develop from buffing, burring, grinding, polishing, curing or any other processing operation, they are swept up on an air stream that carries them back through ducts to a central Collection Unit. In the washing chamber of this Unit the CENTRI-MERGE high pressure centrifugal water action literally *scrubs* every last vestige of contamination from the air stream—cleans it so thoroughly that, in many cases, it can be recirculated back into the plant. That's why users are so enthusiastic about what CENTRI-MERGE accomplishes. Protects both workmen and work.

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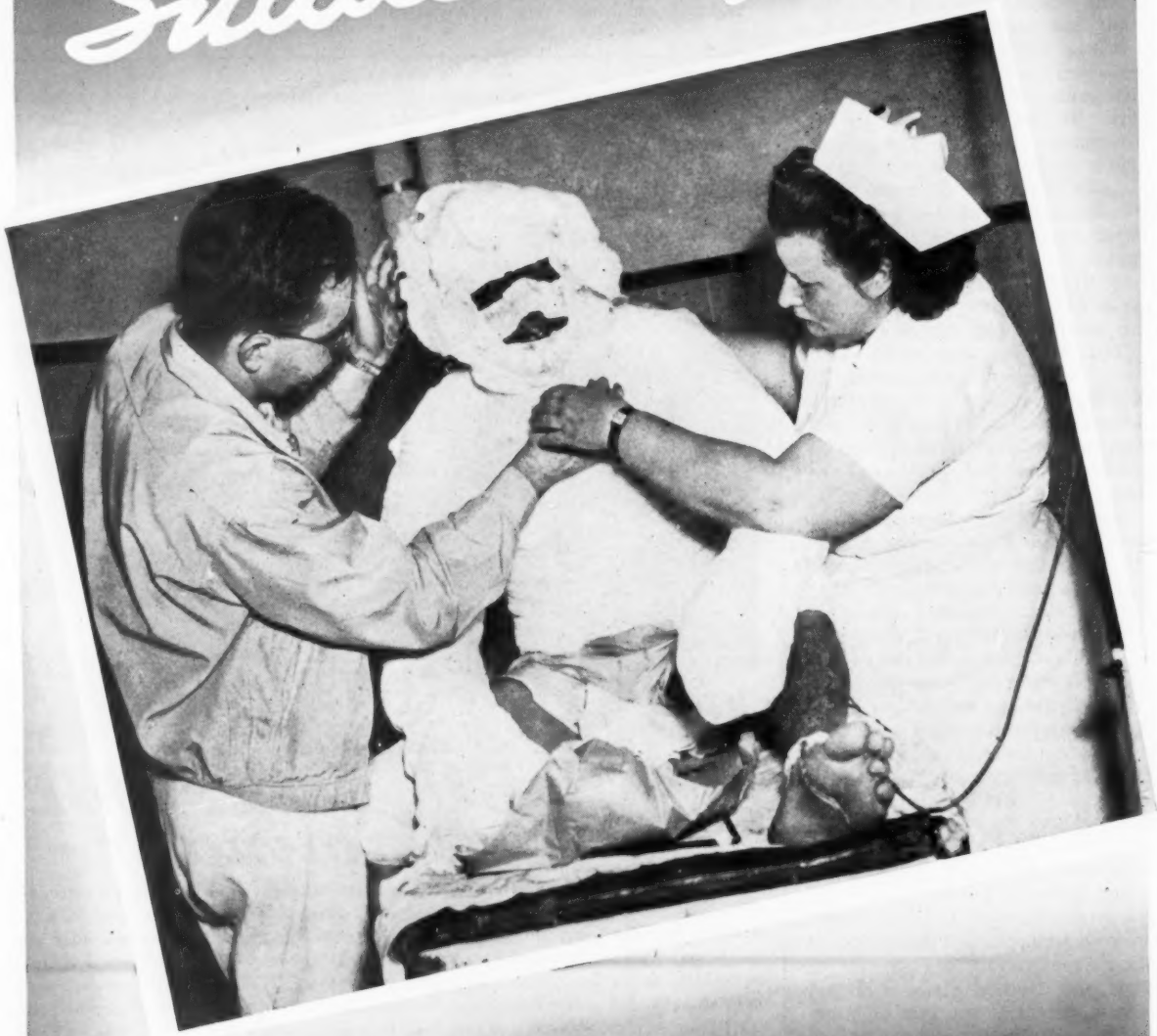
. . . And Sudden Injury



Workman being treated for burns after a 5,000 gallon tank of naphthalene exploded, killing at least eight other workmen. This man died of his terrible injuries two hours after this picture was taken. *(Acme Photo)*

. . . AND SUDDEN INJURY

The National Fire Protection Association include napthalene in their Table of Common Hazardous Chemicals. Instructions under the "Storage" column read *"Isolate; keep away from fire or heat."*

Over on the left is a picture illustrating what happened when these simple instructions were ignored. Someone got careless—someone perhaps breezed past a "No Smoking" sign with a cigarette dangling from his mouth and BOOM—5,000 gallons of napthalene blew up killing nine men, and another plant is destroyed . . .

When your foreman calls your attention to certain "No Smoking" signs; when he directs you to use care while welding or cutting; when he asks you to use safety cans when transporting small quantities of flammable liquids; whenever he gives you *any* kind of safety instructions—for your sake—BELIEVE HIM! Not only realize that he knows what he is talking about, but make it your number one duty to keep believing him and act accordingly. Your carelessness, your sudden lapse of memory, might cause untold harm and injury to you and your fellow workers.

Chances are, there's a guy in your plant called a "safety engineer", "safety supervisor", or maybe a "safety director." Whatever he is called, he's the guy who is very much concerned with your welfare. He's the guy you probably see tacking up safety posters, signs and regulations around the plant. He probably knows you by your first name and stops to chew the fat with you once in a while. Occasionally he might point out to you something about your job that might be hazardous. He might remind you of something nearly forgotten. The safety engineer reads a lot of the latest dope on safety every day. He is being paid to keep you from getting hurt or hurting others. He and your foreman aren't a couple of dumb jerks—if they were they wouldn't be holding down their jobs. The information these men give you doesn't cost a cent. Why not take advantage of this and ask for all the information you can—it's worth your life!

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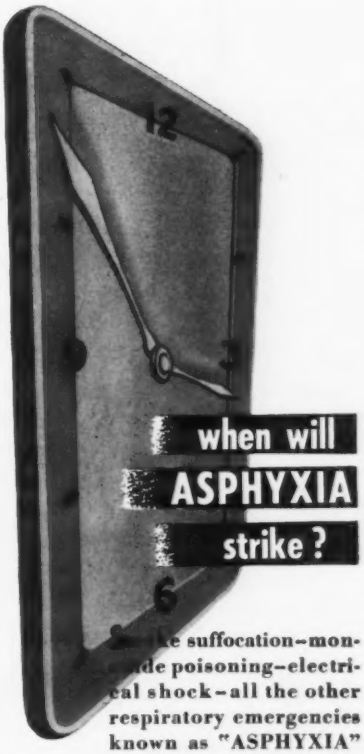

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COST OF AMPUTATIONS—$825.04 From page 15

75 to 2005 minutes. Eighty per cent of the cases show days absent from the job. No absence in two cases is explained by the fact that the injured workers had been made foremen just prior to the injuries and could perform the duties of the new jobs without using the injured member.

The study revealed that the nurse spent an average of 150.5 minutes on amputation cases. The average number of doctor's calls was 10.9 while the average number of treatments using medical supplies was 25. An operation was required in all amputations, and all cases received hospital care. Compensation was paid to 60 per cent of the injured workers, and permanent disability payments were made in 100 per cent of the cases.

Data on the cost of 10 amputations are included in the table shown with this article. The average cost of time lost was $10.07 and the overhead was $20.19. (In connection with this overhead cost: These figures were furnished to Mr. Windsor by Le Tourneau's cost accounting department and included a copy of the hourly wage cost and the hourly overhead cost of plant operations which even included cost of machining parts.—Ed.) The administrative charge was $3.98 in each case because all required special investigation.

NEXT MONTH!
COST OF INFECTIONS
DON'T MISS IT!

Medical expense for amputations was high. Cost of nurse's time averaged $1.62 while cost of doctor's calls averaged $15.05. In all cases where an operation charge was entered, no charge was made for the doctor's first call. One or more operations were required in all cases. No operation charge was entered in one case because the operation was performed by the hospital doctor—this cost being included in hospital care. The average cost of operations was $7.08 while medical supplies used at the plant for amputations cost an average of $.60 per case. No x-rays were taken at the plant, but all cases were hospitalized. The average cost of such cases was $41.04.

Transportation was furnished in 4 cases. A charge of $.85 for a taxi was made in each of 3 cases and an ambulance charge of $7.00 was made in the other case. The average total medical expense was $66.37. Six (6) cases were paid compensation, ranging from $22.67 to $201.49. All cases were paid permanent disability. The amount of payments ranged from $263.20 to $2997.10. *The grand total cost of amputations ranged from $346.70 to $3470.92 and averaged $825.04.*

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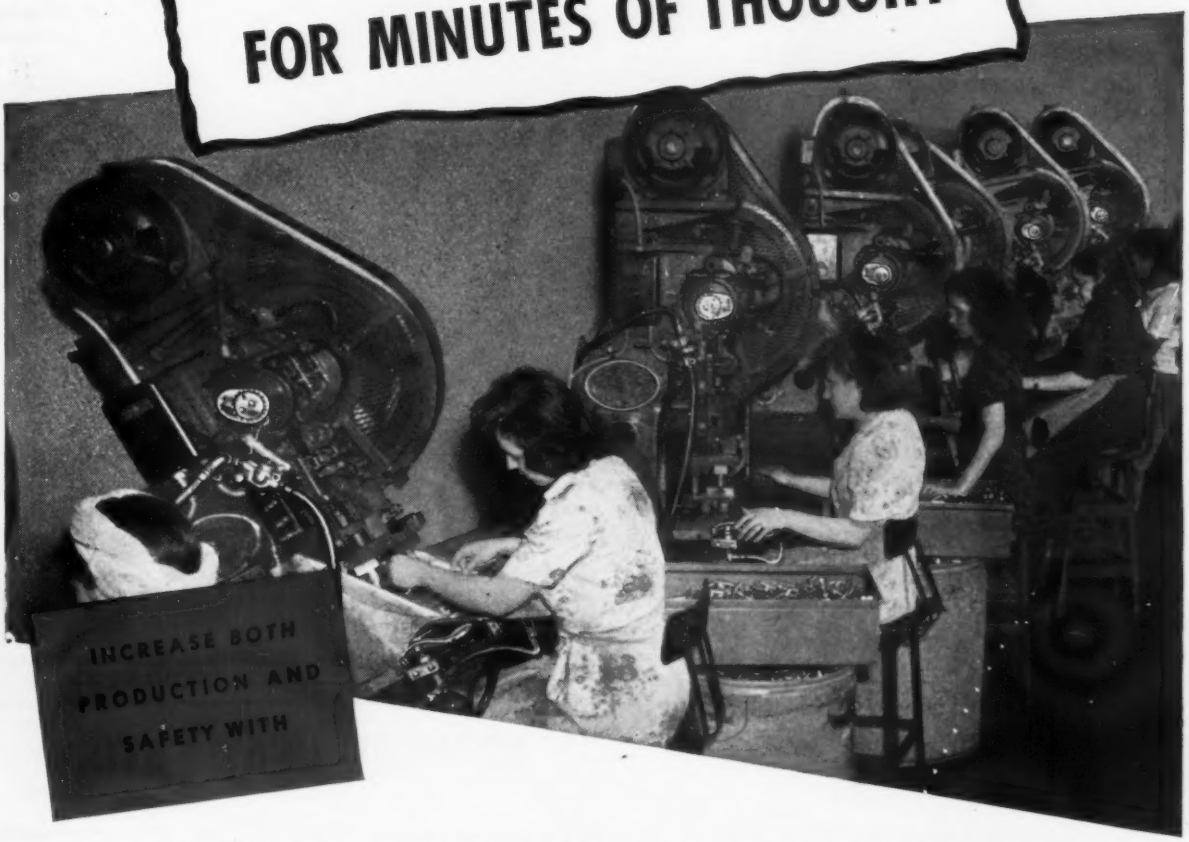

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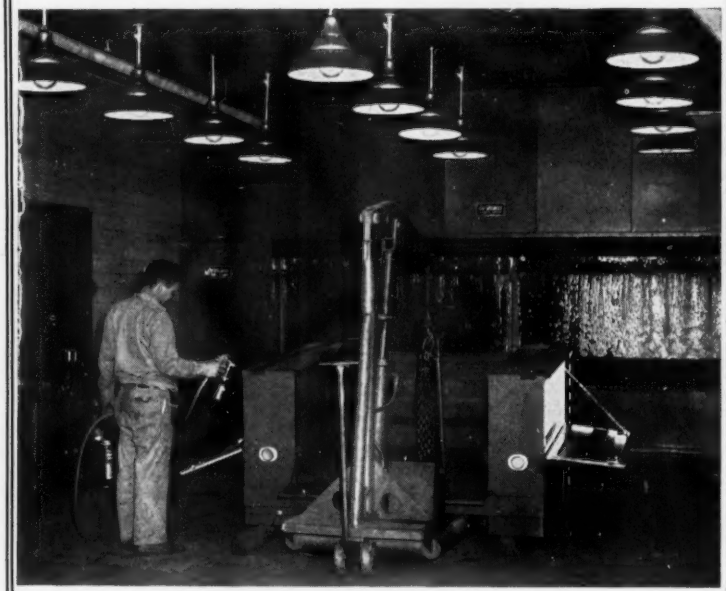

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FIRE PROTECTION FOR INDUSTRY

A SECTION IN WHICH ARE PRESENTED THE VARIED SPECIALIZED PROBLEMS AND SOLUTIONS TO FIRE FIGHTING CONTROL AND PROTECTION IN INDUSTRY

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PREVENTING DUST EXPLOSIONS IN TERMINAL GRAIN ELEVATORS

GOOD housekeeping and clean premises are the first essentials in the elimination of explosions in terminal grain elevators according to the Committee on Dust Explosion Hazards of the National Fire Protection Association. In preparing their standards for the prevention of dust explosions, the Committee lists two principal objects; first to prevent dust explosions and minimize the resulting damage should an explosion occur; and second, to provide standards for minimizing fire hazards. *Every potential fire cause may produce a dust explosion.*

In Short:

1. **Efficient Ventilation**
2. **Dust Removal Systems**
3. **Vacuum Sweeping Apparatus**
4. **Approved Electrical Equipment**
5. **First Aid Fire Appliances**
6. **Sprinkler Systems**

Structural Features

The standards as set forth by the committee assume that all new terminal elevators are of non-combustible construction. Where combustible material (other than grain and belts), in whatever form, is present in quantity sufficient to produce a serious fire, all steel work exposed should be protected by approved fireproofing unless automatic sprinkler protection is afforded. Horizontal surfaces inaccessible to cleaning and all pockets and ledges shall be minimized.

Construction of elevators is largely determined by individual considerations of cost and local building regulations. The Committee points out, however, that the lighter the construction, the less damage will result from an explosion. Large window areas are desirable for explosion-venting purposes, single strength glass being preferable. Wired glass should not be used except where necessary as protection against exposure to fire hazard.

As great a space as is practicable shall be provided between various buildings or sections of the elevator. Track shed for unloading and loading of cars shall be separated from the elevator by a tight incombustible partition to exclude dust from entering. At points where belt conveyor galleries or tunnels are connected to main buildings, tight incombustible partions shall be provided; belt opening should be as small as possible and equipped with a vertical automatic fire door which closes down on the belt.

The Committee suggests that all bins and tanks be provided with dust-tight cover or deck, the bin floor being water-tight to prevent water damage to grain in event of explosion or fire. Exterior walls of basements and tunnels should have as much natural light and ventilation as possible. Tunnels and galleries should be of such width and height as to afford easy access for sweeping on both sides and under each belt.

There should be at least one interior stair from basement to first floor and from the first floor to the top floor enclosed in dust-tight incombustible shafts, preferably built of concrete. The first floor of the working house should be provided with as many exit doors as practicable.

Ventilation

All buildings shall be provided with the largest practicable area of windows. All rooms and areas, including basements, tunnels and galleries shall be well ventilated by windows or otherwise. Roofs of track shed, cupolas, galleries and tunnels, where possible, should be provided with monitors or other ventilators which will, in conjunction with windows, provide frequent change of air. Bins or tanks shall be provided with adequate positive air aspiration.

Equipment

Elevator leg belts shall be enclosed in separate casings, leg casings and connecting spouts being dust-tight. All doors or other openings in same shall also be equipped with dust-tight covers. The Committee states that wood or wood rim pulleys should never be used. All elevator legs should be equipped with an automatic mechanical or electrical tamper-proof device to stop the leg in event of a choke.

Approved permanent magnets or approved self-cleaning electro-magnetic or pneumatic separators should be installed in an approved manner ahead of all shellers, crackers, crushers and grinding machinery. It is also recommended that where feasible, approved magnetic separators of the permanent magnet or self-cleaning electro-magnetic type be installed over the belt conveyors from track shed or truck dump hoppers.

If friction clutches are used, they shall be constructed of incombustible material. Screw conveyors should be fully enclosed. Anti-friction bearings with tight closures of all lubrication inlets are recommended by the Committee for use on all machinery and equipment.

Dropping grain from bin bottoms or conveying in open chutes releases dust clouds dense enough to explode, and scatters large amounts of dust which must be swept up. Special designed aerators located on the exterior of elevator or separated from same by a space, are now used to some extent and are recommended as removing a dust-creating process from the working story to the open air.

Spouts introducing grain into bins should be arranged, where possible, to prevent grain stream striking side of bin, on account of the possibility of tramp iron striking a spark on contact with side.

Grain Driers

The Committee states that all driers should be placed in a separate fire division, separated from elevator or tanks by as much space as practicable, and separated from each other by dust-tight partitions.

Steam coils shall be so designed that dust will not lodge on coils, headers or elsewhere in casing. The coil room should be separated by dust-tight partitions and floors from drying section and all other parts of drier house. In fire heated driers the furnace shall be located in a fire-resistive room separated from drier and elevator by masonry walls with no communication to drier except duct for products of combustion. Driers should be equipped with a reliable automatic means for regulating temperature and an independent device to prevent dangerous temperature rise.

Removal of Dust from Equipment

All heads, boots and garners, shall be dust-tight and provided with adequate positive air aspiration or effective vents to outside. All places where grain is discharged onto belts shall be provided with adequate positive air aspiration and all conveyor belts should be provided with a hood covering extending the entire length. Canvas properly flame-proofed or other approved material should be used for this purpose.

All places where belts discharge grain should be provided with adequate positive air aspiration both above and below grain stream. All cleaning and similar machines which produce an appreciable amount of dust shall also be equipped with adequate positive air aspiration.

The dust liberated by car unloading, and especially where car dumpers are used, should be controlled by enclosing as much of the top of the track hoppers as possible and applying positive air aspiration.

Fire Protection

Smoking shall be prohibited in grain elevators and conspicuous signs to that effect posted throughout the buildings. Approved containers shall be provided, all oily waste emptied daily.

In shoveling of grain, dust and other refuse on concrete or steel bin bottoms, floors, etc., the danger of igniting suspended dust by sparks should be reduced by equipping the cutting edge of shovels with a strip of nonferrous metal or by use of wooden or approved non-sparking shovels.

A half million dollars can make a lot of smoke! It could have been prevented. (Acme Photo)

Suitable first-aid fire protection shall be provided in incombustible buildings to protect all combustible parts, machines, etc., and throughout all combustible buildings. Suitable fire extinguishers shall be maintained near all motors and other electrical apparatus.

All combustible elevators should be patrolled by watchman reporting to approved time recording apparatus. Standpipe systems should be installed to protect all parts of combustible elevators and to protect non-combustible buildings containing combustible parts. An approved system of automatic sprinklers is recommended for any combustible grain elevator, and, where feasible, for the protection of such parts of incombustible elevators as contain combustibles, other than grain and belts, in quantity sufficient to produce a serious fire.

Removal of Static Dust

Dusts on floors and other surfaces shall be removed daily by sweeper. Push brooms of hair or soft fibre are recommended, as they will throw less dust into suspension. The development and installation of satisfactory permanent vacuum sweeping apparatus is recommended. Floor sweeps (Sweep-Up "pipes") shall be located at convenient points throughout the building to facilitate disposal of sweepings by introducing them into dust collecting systems.

Electrical Equipment

All wiring and electric equipment in terminal grain elevators shall conform to National Electric Code.

Unenclosed motors, such as are used in many elevators, gather dust in the windings, which is blown out by compressed air. While objectionable because it throws dust into suspension, periodic cleaning is necessary, and no better method being known, it is recommended by the Committee that such motors be blown frequently *under supervision of plant electrician.*

Table of Common Fire Hazardous Chemicals

Part IX

From a table Prepared by Committees of the National Fire Protection Association and American Chemical Society.

Tentatively adopted 1928, *adopted* 1929, *amended* 1931, 1935, 1938, 1939, 1941, 1942 and 1944.

NOTE. These columns are informative only; it is not considered necessary that the material be kept or stored only in the containers as listed, nor that each package be labeled. The requirements in the table on the storage of containers refer to chemicals in usual containers, and are not intended to apply to small bottles of chemicals such as are found in drug stores and chemical laboratories.

Name	Usual Shipping Container	Fire Hazard	Storage	Fire Fighting Phases
Uranium Nitrate	Glass bottles, boxes.	Oxidizing material. Classes with sodium nitrate.	See sodium nitrate.	
Vinyl Ether	Glass bottle and metal cans.	Highly volatile flammable liquid. Flash point below—22°F. Gives off even at comparatively low temperatures vapors which form flammable mixtures with air or oxygen. Explosive range 1.70% to 27.0% (upward propagation.) (11) Hazard in a class with ethyl ether.	Isolate. Safeguard containers against mechanical injury.	Lighter than water (Sp. Gr. 0.774). Not soluble in water. Water may be used only to cool metal containers. Best extinguishing agents are carbon dioxide, sand, and carbon tetrachloride.
Zinc Chlorate	Glass bottles, iron drums.	When in contact with organic material explodes by slight friction, percussion or shock. Classes with potassium chlorate.	Store in a cool well ventilated storeroom. Safeguard against mechanical injury; avoid tiering: isolate.	
Zinc Powder or Dust	Cartons, wooden barrels, or steel drums.	Hydrogen is evolved when commercial zinc is in contact with acids, sodium hydroxide, or potassium hydroxide. Hydrogen also evolved by acid-forming combinations containing zinc, such as zinc chloride and moisture. Dust may form explosive mixtures with air. Zinc dust in bulk in a damp state may heat and ignite spontaneously on exposure to the air.	Store in dry, ventilated place away from water or moisture. Isolate from acids.	Smother with sand, ashes, or rock dust. Do not use water.
Zirconium Encountered in granular, finely-divided powder; also in form of small, friable, spongy lumps.	Wooden kegs. Glass bottles.	Has comparatively low ignition temperature. Highly flammable in dry state. Burns with an intensely brilliant flame Explosive in contact with oxidizing agents. Powder very susceptible to ignition by static electricity, and explosion may be caused when dispersed into a cloud in air by the static charges generated.	Store only in wet condition and in small quantities. Isolate from oxidizing materials	Investigation of this phase not complete, but available data indicate fires can be controlled by foam or sand. Carbon tetrachloride, carbon dioxide, soda and acid, extinguishers ineffective.

(Last of a series which has been appearing in this magazine.)

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Just to make sure . . .

TAKE A SECOND LOOK AT THAT FIRE DOOR!

by MALCOLM E. FISCHER
Executive Secretary
National Metalclad Door Association

THIS is not to be a discussion of Building Codes, but rather a consideration of the use of fire doors from the point of view of the plant fire marshal.

However, to illustrate our problem, one of the better and widely used pattern-codes contains a section captioned: "Assemblies for the Protection of Openings." That is fine—as far as it goes. But the text refers only to the test, classification or rating of the door itself and regulates the uses to which the various types may be put. *It omits any mention of the hardware that holds the door in place, the mechanism which causes it to operate when fire occurs, or the frame which prevents passage of flame around the door.*

This illustrates the mutual problem of the plant fire marshal and the producers of fire doors. If you approve an installation of a labeled door and failure occurs due to sub-standard accessories, you and your department cannot escape criticism and blame even though the code had been fully enforced. In the same circumstance we, the suppliers, who have provided the label door bearing our identification will be accused of producing inferior products although failure has occurred in accessories over which we have no control.

Our experience has shown an amazing percentage of capable and qualified men in Building and Fire Prevention Departments who do not realize that the Underwriters' Label on a door in no way certifies the fire-resistance qualities of tracks, hangars, or hinges, or bumpers, or binders, or locks, operating mechanisms or frames. A general feeling exists that the label on a door covers all these accessories. *This is completely untrue and we are endeavoring to bring this unfortunate situation to the attention of Inspection Departments and Code Authorities wherever possible.*

There is only one way to be sure that a fire door installation is completely adequate—to be sure that there can be no repercussions after inspection and approval. The Underwriters' Label or Mark of Approval on every door panel, every frame, every item of hardware and the fusible link or other operating mechanism is your only guarantee, and the only guarantee to the persons in your plant.

To be sure, certain insurance companies make careful inspections. These inspections are limited, however, to their own policyholders and only the largest industrial plants can provide their own services.

You are probably wondering why we, as an industry, do not do something about labeling a complete assembly. We would like to do this. Inasmuch as codes are not and probably cannot be written to require that the assembly shall be produced or supplied by a single manufacturer, we are unable to do so. It would mean that each door manufacturer would have to run thousands of separate tests. Each door would have to be tested with every conceivable combination of hardware provided by all of the hardware manufacturers.

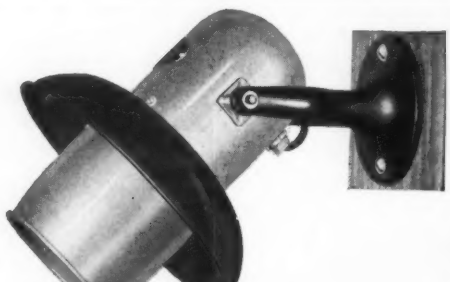
One of the largest losses on record this year occurred in a manufacturing building completely protected by labeled fire doors. Over a million dollars were lost because the owner had failed to provide automatic operating mechanisms. He had relied on manual operation of his fire doors. The fire was a flash fire and, as is perfectly natural, the first thought of the plant personnel was to get out—but quick—and wouldn't you? The doors remained open.

I would not attempt to place responsibility for this unnecessary destruction of wealth but certainly *the management should have realized the limitations of their installation or someone should have told them. A few hundred dollars invested in fusible link operated devices would have prevented this tremendous loss of property, production, and jobs.*

This is another example of the chain being only as strong as the weakest link.

You have probably noticed that we have made frequent reference to the Underwriters' Label and no mention at all of hourly ratings; and are perhaps wondering why. The producers of fire doors have found the Underwriters' method of approval and classification provides the most workable basis for standards of construction and tends to eliminate the competition of inferior construction.

The hourly rating of fire doors is usually one hour



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Write for Bulletin 111

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or one-and-one-half hours—a very narrow range. Almost any door of good construction will meet the higher requirement in some situation. The situation for which the door is intended is, in our opinion, the most important consideration. A fire door intended for use in an exterior opening with low or moderate exposure hazard would probably stay in place for an hour-and-a-half but I'm sure that none of us would recommend one of these doors on each side of a fire wall as sound protection. The Underwriters' Label definitely established the type of opening in which any door may be used.

It also takes into consideration several other important considerations which an hourly rating cannot cover. It controls the amount of glass which may be used and contemplates the amount of heat transmitted and smoke generated. Each type of construction has its advantages and its limitations in these respects and approval by the Laboratories is based on careful consideration of all these factors. Smoke generation and heat transmission cannot be boiled down to a specific formula and so the door must be judged on the basis of experience and selected on the basis of its known qualities.

Danger of "Economy"

It seems to me that economy is the only reason for reducing the fire-resistance requirement of doors. Undoubtedly the desired economy could be accomplished by reducing these requirements for walls and ceilings, but, in our efforts to develop a less-resistive door we find no opportunity to create a cheaper door without sacrifice of essential construction features. This is our answer to the frequent question: "Why should I put a one hour door in a forty-five minute wall"?

Also in the interest of economy owners or contractors are often asked to accept doors of "Underwriters' construction—not labeled" at a cut-price. In one case it was claimed that a saving of eight dollars per door could be effected without sacrifice of quality. The impression was created that this was the cost of the label. As a matter of fact the label costs exactly seventy-eight cents. Of course, there is the cost of the Laboratory test. This could amount to about one thousand dollars. It is frequently less and rarely more. I do not think it would be unreasonable to expect to pro-rate this cost over at least five thousand doors. This would produce a unit cost of twenty cents each or about a dollar a door for test and label.

Where would the other seven dollars be saved?

Would it be lumber which had been rejected for labeled doors?

Would it be in light-guage metal? Omission of reinforcement for hardware? Poor welding or nailing?

I don't know and you would never know because after the door is built its inner construction is forever a secret unless revealed by failure of the door during fire—when it's too late. Certainly this saving must be in workmanship or material.

Homemade Fire Door

We have been hearing much about "Jerry-built" construction lately in relation to the housing program. It has been severely criticized and much thought given to its control. That is another form of "Jerry-built" construction. So is the so-called homemade fire door.

Our recent nation-wide drive against potential fire-traps now in existence has resulted in many attempts to cover existing wood doors with sheet metal, call them fire doors, and secure approval from building departments. And too many such attempts have succeeded.

Let me diverge for a moment to tell you what happens to a tin-clad door in a fire. The tin-clad door is a very efficient, if impractical means of manufacturing charcoal. It is in effect a sealed vessel charged with wood containing combustible gases with insufficient oxygen present to support combustion. This is exactly what happens in the door. The core does become charcoal and acts as a very efficient insulator as long as it is contained in the metal cover.

Charcoal is very effective as an insulator. I think you will recall that it was one of the first materials used for the purpose. In our early ice-boxes—for example.

If we cover a paneled or wood slab door with metal secured in place with wood screws, I suspect the same results could be expected and while the insulating effect of the charcoal would be very desirable, I do not think we would find it a very satisfactory anchorage for the wood screws. The plates would undoubtedly fall away in a few minutes and our insulation would become a fine source of fuel rather than a barrier to the flame.

In every attempt to improvise fire doors some such condition or reaction can be expected and we hope you will discourage this practice at every opportunity.

It is not a "Fire-Door" unless its fire-resistive qualities are known and proven. For your own protection, let's demand proof.

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Useful Literature

UL-25 . . . United Laboratories, Inc., has just completed an entirely new process system for the complete repair of roofs of all types. This process system is highlighted by a brand new two-color folder containing pictorial instructions as to proper methods of roof maintenance. The process Index contained in this packet simplifies the individual problem by making is easy to select the process pertaining to a specific type roof. Instructions, type of materials to use, quantity estimates are included in each process.

A copy of this complete illustrative and instructive folder on proper roof care is available upon request without obligation.

UL-26 . . . The Buckner Process Company has recently released a new, six-page, two-color circular replete with half-tones and line drawings describing in detail the functions and scope of their famous "Lion Paw" brand conveyor belting, transmission belt and *safety matting.*

UL-27 . . . Charts showing the characteristics of approved hand fire extinguishers and the comparative effectiveness of approved extinguishers on flammable liquid fires are features of a new catalog recently issued by Ansul Chemical Company. The 20-page catalog illustrates and describes the complete line of Ansul Dry Chemical Fire Extinguishers. Included is a pictorial explanation of the action that takes place when chemical comes in contact with flame.

UL-28 . . . A. Pendleton, manufacturers of asbestos cloth products, have prepared a booklet in which their complete line of asbestos gloves, aprons, sleeves and finger cots are presented. Each item is illustrated in the booklet. The products are said by the manufacturer to be especially designed for proper fitting and maximum sturdiness for long wear and to provide dependable and effective protection against fire, heat and sparks.

UL-29 . . . A new bulletin is now available describing some of the Industrial Products Company's newer products. Included in the illustrated list are their "Whale-Hide" synthetic gloves; coated canvas gloves; pure gum gloves; chemist aprons; neoprene aprons; rubber cushion knee pads; synthetic sleeves and the IPCO two-piece rubber suit. Each product is pictorially presented and completely described including prices.

UL-30 . . . The Magnesium Company of America have prepared a pictorial pamphlet in color describing their MAGCOA line of material handling equipment. Made of magnesium, these products, such as dockboards, barrel skids, hand trucks and grain shovels, are described by the manufacturer as being amazingly light. This factor promotes safe, quick, efficient and nonfatiguing handling operations.

UL-31 . . . **SAFETY SHOES.** A new attractively printed, conveniently arranged 24 page safety shoe catalog has been issued by Iron Age. It is of standard file size and features large illustrations of each Iron Age style,

colorfully depicted in natural tones of brown, tan, or black. A full complement of descriptive text, specifications and size range accompanies each shoe cut. The "Quick-Finder" index is of material assistance in selecting the proper type of safety shoe for every job or service qualification. The new line of Saftopedics is fully described in a separate chapter.

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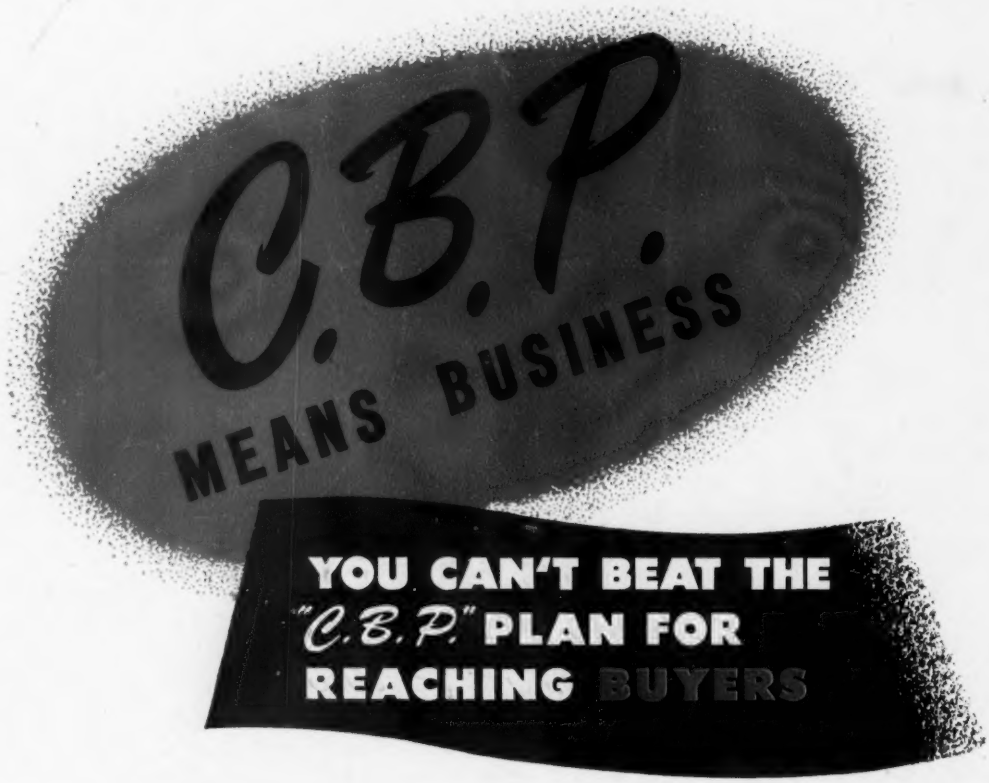

In the case of OCCUPATIONAL HAZARDS, The C. B. P. Plan (Certified Buying Power) almost 20,000 readers who are "known" buyers. These individuals are hand-picked from the customer-prospect lists of 31 selected safety equipment jobbers located in key marketing areas. To the CCA guarantee of QUANTITY circulation, OCCUPATIONAL HAZARDS thus adds the C. B. P. QUALITY guarantee of authenticated, proven reader-buyers. Here is the needed sales link for the advertiser.

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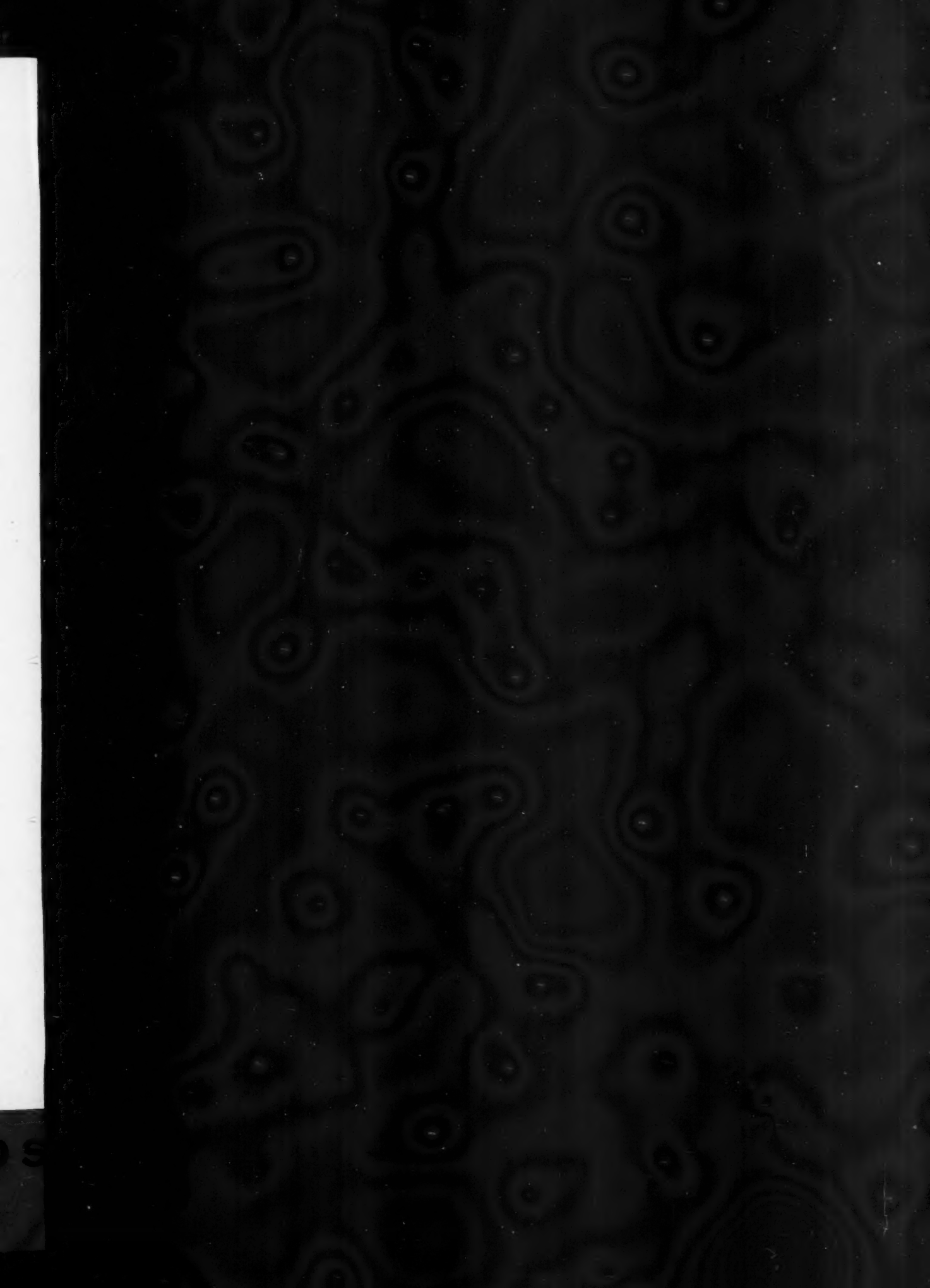
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